





Matters of National Environmental Significance Management Plan Annual Report 2019/2020 Meteor Downs South Coal Project

EPBC 2013/6799

Sojitz Blue Pty Ltd





APPROVALS

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	Name	Position	Date
ORIGINATORS	Meghan Farr	Environmental Scientist	24 July 2020
APPROVER	Jarrad Cousin	Senior Ecologist	27 July 2020

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DAWE	Commonwealth Department of Agriculture, Water and the Environment
EA	The Environmental Authority (EPML00559513) for the Meteor Downs South Coal Mine
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
ha	Hectare
MDS Project	The Meteor Downs South Coal Project
MDS Project site	The area set out in the Mining Lease (ML70452) for the Meteor Downs South Coal Mine.
MDS Project footprint	The area disturbed to facilitate mine infrastructure
MNES	Matters of National Environmental Significance
MNESMP	Matters of National Environmental Significance Management Plan
RE	Regional Ecosystem
ROM	Run of Mine
Sojitz Blue	Sojitz Blue Pty Ltd
TEC	Threatened Ecological Community

ABBREVIATIONS AND ACRONYMS



1 INTRODUCTION

1.1 BACKGROUND

Sojitz Blue Pty Ltd (Sojitz Blue) operates the Meteor Downs South project (MDS Project) in central Queensland on behalf of its joint venture partner U & D Mining Industry (Australia) Pty Ltd (U&D). The MDS Project is a small open cut coal mining operation located between Rolleston and Springsure in the Central Highlands Regional Council local government area in Queensland (Figure 1).

The MDS Project was granted Commonwealth Government approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 25 November 2014 (EPBC 2013/6799). State Government environmental approval was granted by the Queensland Department of Environment and Resource Management in July 2013 (Environmental Authority EPML00559513).

To satisfy conditions 2, 3 and 4 of the EPBC Act approval, a Matters of National Environmental Significance Management Plan (MNESMP) was developed. The MNESMP provides for the management of direct and indirect impacts of the MDS Project on the following matters of national environmental significance (MNES):

- Brigalow (Acacia harpophylla dominant and co-dominant) threatened ecological community (Brigalow TEC)
- Natural Grasslands of the Queensland Central Highlands and Fitzroy Basin threatened ecological community (natural grasslands TEC)
- king blue-grass (Dichanthium queenslandicum)
- bluegrass (Dichanthium setosum)
- squatter pigeon (southern) (Geophaps scripta scripta)
- > Australian painted snipe (*Rostratula australis*).

The MNESMP covers the MDS Project site which is the area set out in the Mining Lease (ML70452) for the Meteor Downs South Coal Project.

The MNESMP was approved by the Commonwealth Government on 18 January 2018.



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1.2 PURPOSE AND SCOPE

As part of the MNESMP an annual report is required to be submitted to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) by 30 June each year, documenting the implementation of and adherence to the MNESMP. As COVID-19 restrictions have resulted in the delay of some of the monitoring activities required to be undertaken during this reporting period, the submission date for this annual report has had to be pushed back.

This this report has been prepared by CO2 Australia Limited (CO2 Australia) on behalf of Sojitz Blue for the reporting period from July 2019 to June 2020. The scope of this report includes:

- current MDS Project details, including relevant contacts
- climatic conditions during the reporting period
- activities undertaken during the reporting period including:
 - construction and operational activities
 - mitigation and management measures
 - monitoring activities
- > an assessment of the adherence to the performance criteria set out in the MNESMP
- a description of the potential threats and risks to MNES
- proposed amendments to be made to the MNESMP
- details of any corrective actions required to be implemented
- a management, monitoring and reporting schedule for the next reporting period (i.e. July 2020 to June 2021).

2 PROJECT DETAILS

Relevant approval and contact details for the MDS Project are provided in Table 1.

Table 1: Project details

Meteor Downs South Project				
Mining Lease Number	ML70452			
Lot Plan Locations	2RP616045, 4SP170740, 1SP164068, 1SP174071, 4RP617701			
EPBC Act Reference No.	EPBC 2013/6799			
Queensland Government Environmental Authority	EPML00559513			
Project Contact	Annalise Clarke Senior Environmental Advisor Sojitz Blue Pty Ltd <u>aclarke@sojitzblue.com.au</u>			



3 CURRENT CONDITIONS

During the 2019/2020 management period, a total of 395 mm was recorded at the nearest weather station (Comet Street, Springsure #35065) which was only 57% of the long-term annual average of 686.5 mm. The five months in 2019 leading up to the wet season (August to December) saw only 44 mm of rain, representing only 17% of the long-term average of 257.2 mm (Figure 2). Notably, no rainfall was recorded in December.

The temperature data indicated mean maximum and minimum temperatures were greater than the longterm average from 10 of the 12 months, with the mean maximum and minimum temperatures during the management period ~3.2°C and 3.7°C above the long-term average, respectively. This included a particularly hot December 2019, where the maximum temperature averaged 41.7°C; being 7.6°C higher than the long term average (Figure 3). Minimum temperatures during the first four months of the management period (July – October 2019) averaged 7.7°C above the long term average, with the July 2019 mean minimum temperature (14.9°C) being 8.5°C higher than the long-term average of 6.4°C.

In summary, the climate conditions during the 2019/2020 management period could be characterised as being considerably warmer and drier than normal.











4 REPORTING PERIOD ACTIVITIES

Table 2 summarises all activities required to be undertaken in accordance with the MNESMP and indicates which activities were relevant to, and completed during, the reporting period. It also provides an explanation of why an activity was not undertaken, where applicable.

Sections 4.1 to 4.3 provide details for all activities that were undertaken during the reporting period. These include construction and operation activities, mitigation and management measures and monitoring activities.

Table 2: Management, monitoring and reporting activities for the current reporting period

Action	Timing	Completed	Comments
Management			
Provision of mapping of MNES habitat to clearing personnel and contractors	Prior to vegetation clearing works	~	Refer to Section 4.2.2
Provision of environmental awareness training to all personnel and contractors	During site inductions	~	Refer to Section 4.2.1
Implementation of permit to disturb system	During vegetation clearing works	\checkmark	Refer to Section 4.2.2
Demarcation of areas of MNES habitat adjacent to clearing areas	During vegetation clearing works	~	Refer to Section 4.2.2
Implementation of weed and pest management plan	During construction and operations	~	Refer to Section 4.2.3
Progressive rehabilitation of disturbed areas as per the Environmental Management Plan	During construction and operations	~	Refer to Section 4.2.7
Implementation of dust suppression techniques in accordance with the <i>Coal Mining Safety and</i> <i>Health Act 1999</i> and Coal Mining Safety and Health Regulation 2017	During construction and operations	✓	Refer to Section 4.2.4
Prevention, preparedness and management of fire hazards in accordance with the <i>Coal Mining</i> <i>Safety and Health Act 1999</i> and Coal Mining Safety and Health Regulation 2017	During construction and operations	✓	Refer to Section 4.2.5



Action	Timing	Completed	Comments
Enforcement of speed limits on internal roads	During construction and operations	✓	Refer to Section 4.2.6
Monitoring			
Monitoring of vegetation clearing impacts on MNES	Quarterly	~	Refer to Section 4.3.1
Audit of the permit to disturb system	Quarterly	✓	Refer to Section 4.2.2
Visual inspections of Brigalow TEC	Quarterly	\checkmark	Refer to Section 4.3.2
Visual inspections of king blue-grass and bluegrass populations	Biannually	~	Refer to Section 4.2.2
General site inspections	Biannually	✓	Refer to Section 4.3.2
Habitat condition assessments	Annually, during the same season as baseline assessments	~	Refer to Section 4.3.4
Photo monitoring	Annually, at the same time as the habitat condition assessments	~	Refer to Section 4.3.3
Targeted surveys for king blue-grass and bluegrass	Annually	\checkmark	Refer to Section 4.3.5
Pest animal monitoring	Every second year	✓	Refer to Section 4.3.7
Weed monitoring	Every second year	✓	Refer to Section 4.3.6
Biomass monitoring	End of each wet and dry season	\checkmark	Refer to Section 4.3.8
Dust monitoring	As required by the Project EA	✓	Refer to Section 4.3.9
Noise and vibration monitoring	As required by the Project EA	✓	Refer to Section 4.3.10
Water level monitoring of Naroo Dam	Monthly as required by the make good agreement with Glencore	~	Refer to Section 4.3.11
Water quality monitoring	Quarterly, as required by the make good agreement with Glencore	\checkmark	Refer to Section 4.3.11
Reporting			



Action	Timing	Completed	Comments
Review of the MNESMP	Annually		Refer to Section 7 - the MNESMP will be reviewed and amended following the submission of this report
Annual report	Annually, required to be submitted to DAWE by the 30 June	*	This report – as detailed in Section 1.2, the submission date for this annual report has had to be pushed back as COVID-19 restrictions have resulted in the delay of some of the monitoring activities required to be undertaken during this reporting period.



4.1 CONSTRUCTION AND OPERATION

Construction of the MDS Project commenced in January 2018, with the first run of mine (ROM) coal being extracted and delivered in April 2018.

During the 2019/2020 reporting period, construction works have involved the clearing of vegetation and topsoil stripping for pit progression and the expansion of the run of mine (ROM) area and out of pit dump.

The extraction and delivery of ROM coal continued throughout the 2019/2020 reporting period.

4.2 MITIGATION AND MANAGEMENT MEASURES

Sections 4.2.1 to 4.2.7 summarise the measures undertaken during the 2019/2020 reporting period to mitigate and manage impacts to MNES on the MDS Project site.

4.2.1 Environmental Awareness Training

Environmental awareness training is included as part of the site induction material provided to workers. The training covers land disturbance, topsoil management, waste management and rehabilitation works and is included in Appendix A.

The MNESMP requires that the environmental awareness training includes specific topics on MNES, risks and protective measures. As such, it is recommended that the environmental awareness training is updated to address the specific requirements of the MNESMP.

4.2.2 Vegetation Clearing Controls

As detailed in Section 4.1, vegetation clearing and topsoil stripping works have continued to occur throughout the 2019/2020 reporting period. As per the requirements of the MNESMP, the following mitigation and management measures were implemented as part of the vegetation clearing and topsoil stripping works:

- MNES within the MDS Project site was mapped and mapping was provided to all clearing personnel
- environmental awareness training was developed and provided to all personnel as part of the site induction
- the permit to disturb system was implemented
- the permit to disturb system was internally audited every quarter
- areas of MNES habitat adjacent to vegetation clearing works were demarcated
- the total area of MNES habitat cleared was monitored (see Section 4.3.1).

4.2.3 Weed and Pest Animal Control

The MDS Project Weed and Pest Management Plan (Sojitz 2018) has been developed for the MDS Project site. The following measures were undertaken, or planned to be undertaken, to prevent the introduction, establishment and spread of weeds and pest on the MDS Project site:

- The weed wash down facilities at Springsure are currently being used to wash down vehicles and machinery coming onto the MDS Project site. A wash down bay is planned to be constructed on the MDS Project site during the latter half of 2020.
- Spraying of weeds along all access tracks and roads on the MDS Project site has been scheduled for the next reporting period (August 2020).



Additionally, weed and pest animal surveys have been carried out as part of the monitoring activities in this reporting period. The results of these weed and pest animal surveys are included in the Dry Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2019) and the Post-wet Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2020) in Appendix C and Appendix D respectively, and summarised in Sections 4.3.6 and 4.3.7.

4.2.4 Dust Suppression

Dust suppression techniques were implemented throughout the reporting period in accordance with *Coal Mining Safety and Health Act* 1999 and Coal Mining Safety and Health Regulation 2017.

Areas of that may be potentially impacted by the effects of dust generation have had depositional dust gauges installed for monitoring. The results of dust deposition monitoring undertaken at these sites during the reporting period is included in Section 4.3.9.

4.2.5 Fire Prevention and Preparedness

The prevention, preparedness and management of fire hazards on the MDS Project is required to be undertaken in accordance with the *Coal Mining Safety and Health Act 1999* and Coal Mining Safety and Health Regulation 2017.

No uncontrolled fires occurred on the Project site during the reporting period. The existing firebreaks were re-graded in May 2020. Appropriate firefighting equipment was made available and all personnel and contractors were provided with training.

4.2.6 Speed Limits

Speed limit signs have been installed along internal haul roads. All personnel and contractors are also made aware of the speed limits on the Project site through the environmental awareness training provided as part of site induction process.

4.2.7 Rehabilitation

No rehabilitation activities have been undertaken during the 2019/2020 reporting period.

A 2.3 ha area of the north-west out-of-pit overburden dump is planned to be seeded in the next reporting period (August 2020) as per the Land Rehabilitation Section (Section H) of the Environmental Authority. Deep ripping and the spreading of topsoil is also planned for a 7 ha area of the north-west out-of-pit overburden dump during the next reporting period (August 2020).

4.3 MONITORING ACTIVITIES

Details and results of monitoring activities undertaken during the reporting period, and prior to the commencement of construction, are presented below in Sections 4.3.1 to 4.3.11. Table 3 describes the organisations that implemented each of the monitoring programs under the MNESMP.

Table 3: Persons undertaking monitoring

Monitoring Activity	Organisation
General site inspections	Sojitz Blue
Vegetation clearing reconciliation	Sojitz Blue
Habitat condition assessments	CO2 Australia
Targeted flora and fauna surveys	CO2 Australia
Weed and pest animal surveys	CO2 Australia



Monitoring Activity	Organisation
Biomass monitoring	CO2 Australia
Water level and water quality monitoring of Naroo Dam	Sojitz Blue
Dust deposition monitoring	Sojitz Blue

4.3.1 Monitoring of Vegetation Clearing

Since the commencement of construction, Sojitz Blue has regularly monitored the total area of habitat for each MNES that has been cleared to ensure that the total clearing area is:

- below the maximum disturbance limits set out in Condition 1 of the EPBC Act approval, and
- below the actual disturbance limits set out in the MNESMP.

Table 4 outlines the area of habitat cleared for each MNES up until June 2020. As demonstrated in Table 4, the vegetation clearing impacts to June 2020 are below the actual disturbance limits in the MNESMP and also below the maximum disturbance limits in the EPBC Act approval.

Table 4	l: Ve	getation	clearing	impacts	to	June	2020
TUDIC -		Betution	cicuing	impacts	···	June	2020

MNES	Area cleared to June 2020	Maximum disturbance limits (ha) – EPBC Act Approval	Actual disturbance limits (ha) - MNESMP	% of Actual Disturbance Limit Cleared to June 2020
Brigalow TEC	0	2.21	0	-
Natural grasslands TEC	83.03	186	98.9	84%
Squatter pigeon	103.49	240.54	133.1	78%
Australian painted snipe	0.03*	6.6	0	-
King blue-grass	83.03	426.53	98.9	84%
Bluegrass	83.03	426.53	98.9	84%

* The actual disturbance limit for the Australian painted snipe habitat was exceeded by 0.03 ha in 2018. This contravention has been addressed and finalised by DEE in 2018, under CAS3177 (F. Moloney 2019, pers. comms., 24 June 2019).

Since the approval of the MNESMP in January 2018, changes have been made to the Project footprint. These changes relate to:

- Alteration to the haul road ingress/egress point on the Dawson Highway based on safety advice from the Queensland Department of Main Roads.
- Additional areas to channel surface water flows around the mining operations, so as to not impede flows to Naroo Dam.
- Changes to locations of pipeline and access tracks to bores.
- Increase in the size of the ROM coal dump.

These changes have resulted in vegetation clearing works occurring outside of the Project footprint defined in the MNESMP (Figure 4). While the vegetation clearing impacts to June 2020 are still below the actual disturbance limits, the actual disturbance limits need to be recalculated based on the refined MDS Project footprint. Consequently, the MNESMP will be amended to reflect any changes to the MDS Project footprint and the actual disturbance limits and resubmitted to the DAWE for approval (Section 7).



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4.3.2 General Site Inspections

General site inspections of areas of MNES habitat in the MDS Project site are required to be undertaken biannually to identify any potential management issues. General site inspections were undertaken in December 2019 and in June 2020 by Sojitz Blue (Appendix B). General observations of the site were also made by CO2 Australia as part of the dry season and post-wet season surveys (Appendix C and Appendix D).

The following observations were made during the site inspections:

- Firebreaks and access tracks were in good condition, with the firebreaks having been re-graded in May 2020.
- Fences were in generally good condition with the exception of a section of fenceline along the northwestern boundary which had fallen over. This section of fenceline has been flagged for repair.
- Some areas appeared to be subject to overgrazing due to continued grazing during the very dry conditions at the end of 2019. These areas showed considerable recovery following rainfall in 2020.
- Areas of 11.8.11a in the south-west of the MDS Project site appeared to be under stress with the majority of *Melaleuca bracteata* in these areas showing signs of dieback (Figure 5), most likely as a result of the very dry conditions at the end of 2019. Epicormic regrowth however was observed on this vegetation community at the time of the post-wet season surveys in June 2020 indicating that the vegetation community was in a state of recovery.
- There was some evidence of parthenium infestations along parts of the access tracks and firebreaks and in the areas subject to overgrazing.
- There appeared to be an increase in the populations of the kind blue-grass and bluegrass within 500 m of the MDS Project footprint since the baseline surveys.
- There was no obvious evidence of any dust deposition, nor any impacts attributable to dust deposition on king blue-grass, bluegrass or other vegetation communities.



Figure 5: Evidence of dieback of *Melaleuca bracteata* in areas of RE 11.8.11a.



4.3.3 Photo Monitoring

Photo monitoring was undertaken in as part of the dry season surveys in December 2019 and as part of the post-wet season surveys in June 2020. Photos were taken at the 30 permanent monitoring sites, including two at each of the 10 habitat condition assessment sites and one at each of the weed monitoring sites as illustrated in Figure 6. Five photos were taken at each monitoring point from a height of approximately 1.5 m looking north, east, south and west with a ground photo taken looking down at an angle of 45°.

Photo monitoring of the MDS Project site showed a variety of levels of cover ranging from dense grassy understorey through to relatively open areas with evidence of grazing resulting in reduced grass cover. The results from the photo monitoring are presented in the Dry Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2019) in Appendix C and the Post-wet Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2020) in Appendix D.

4.3.4 Habitat Monitoring

Habitat condition assessments

Habitat condition assessments were conducted in December 2019 at each of the 10 permanent habitat monitoring sites identified in the MNESMP.

Site context was assessed at the ten habitat monitoring sites identified in the MNESMP. Table 6 summarises the site condition and site context scores for each of the ten habitat monitoring sites. A detailed description of the habitat condition assessments is provided in the Dry Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2019) in Appendix C.

The results of the habitat condition assessments were used in the calculation of habitat quality scores for each MNES.

Site	RE	Site condition score (/10)	Site context score (/10)
01	11.8.5	7.56	7.69
02	11.8.11	6.83	6.92
03	11.8.5	7.94	7.69
04	11.8.11	8.50	7.69
05	11.8.5	5.31	7.69
06	11.8.11	6.17	7.31
07	11.4.3	7.00	7.69
08	11.8.11	6.33	7.31
09	11.3.3a	6.00	7.69
10	11.8.5	7.75	7.69
Average score	!	6.94	7.54

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MNES habitat quality scores

Habitat quality scores for each MNES were calculated using a combination of the site condition and site context scores from the habitat condition assessments as well as species habitat indices informed by targeted surveys undertaken as part of the dry season survey (Appendix C). Table 6 presents the habitat quality scores for the 2019/2020 reporting period for each MNES.

Habitat quality scores for the six MNES ranged between 5.38 (Australian painted snipe) and 7.17 (Brigalow TEC) out of 10 (Table 6). The comparatively low score for Australian painted snipe habitat is in part attributable to the low site condition for RE 11.3.3a habitat (6.00), but also the low fauna species habitat index (3.20), reflecting an absence of appropriate foraging and shelter habitat at the time of the 2020 dry season surveys. In contrast, Brigalow TEC habitat had the highest habitat condition score (7.17).

Site	RE	Brigalow TEC	Natural Grasslands TEC	King blue- grass	Bluegrass	Squatter pigeon	Australian painted snipe
01	11.8.5					7.08	
02	11.8.11		6.96	5.57	5.57		
03	11.8.5					7.28	
04	11.8.11		8.13	6.50	6.50		
05	11.8.5					5.93	
06	11.8.11		7.14	5.71	5.71		
07	11.4.3	7.17					
08	11.8.11		7.32	5.86	5.86		
09	11.3.3a						5.38
10	11.8.5					7.18	
Average scor	e (/10)	7.17	7.39	5.91	5.91	6.87	5.38

Table 6: Monitoring sites showing their habitat quality scores contributing to MNES

Figure 7 shows the change in the habitat quality scores for each MNES between 2017 and 2019. Note that as targeted surveys for the squatter pigeon and Australian painted snipe were not undertaken as part of the monitoring in 2018/2019 reporting period, habitat quality scores for these species for this period were not calculated.

The habitat quality scores for all MNES, with the exception of the Australian painted snipe, declined in 2019. The decline is most notable in the threatened ecological communities (i.e. Brigalow TEC and natural grassland TEC) and threatened flora (i.e. king blue-grass and bluegrass) and is most likely due to the exceptionally dry conditions, preceding, and at the time of the dry season surveys (Section 3).





Figure 7: Changes in habitat quality scores for MNES between 2017 and 2019

4.3.5 Targeted Surveys

Australian Painted Snipe

Targeted surveys for Australian painted snipe were undertaken during the post-wet season surveys. The surveys were undertaken around Naroo Dam across three mornings for up to three hours each morning from sunrise (~6.30am). Access was granted to Naroo Dam via the Glencore Rolleston Mine, which allowed for the complete circumnavigation of the dam and its fringing habitat.

While surveying for Australian painted snipe was outside of the wet season (defined as between 1 November in one year to 31 May in the following year), and not following any significant inundation event, there was still water within the dam and the low-lying channels feeding into it to support habitat for Australian painted snipe. All suitable habitat for the Australian painted snipe occurred outside of the MDS Project site.

The amount of habitat for the Australian Painted Snipe during the 2020 post-wet season surveys was significantly less than the amount of habitat that was available during the December 2018 surveys (Figure 8 and Figure 9). This is despite water levels in Naroo Dam being similar at the time of the surveys (240.01 RL AHD in December 2018 and 240.33 RL AHD in June 2020 – refer to Section 4.3.11).

While a total of 43 species of birds were encountered utilising or occupying the dam and immediate surrounds, no Australian painted snipe were confirmed during the targeted surveying.

The full results of targeted surveys for Australian painted snipe are presented in the Post-wet Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2020) in Appendix C.



Habitat availability for the Australian painted snipe - 2020



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Sojitz Blue Pty Ltd - Meteor Downs South Location diagram Figure 9: Habitat availability for Australian painted snipe - 2018 Project footprint Mining Lease Fences Mapped habitat for Australian painted snipe in MDS Project area Habitat wailability Australian painted snipe habitat - December 2018 Shallow water foraging habitat Muddy substrate foraging habitat Shelter habitat



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Squatter Pigeon

Targeted surveys for the squatter pigeon were undertaken as part of the dry season surveys in December 2019 and post-wet season surveys in June 2020. Despite more than 550 km of driving and walking throughout the MDS Project site, the squatter pigeon was not detected during the surveys.

The full results of targeted surveys for the squatter pigeon are presented in the Dry Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2019) and the Post-wet Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2020) in Appendix C and Appendix D respectively.

King Blue-Grass and Bluegrass

Targeted surveys for king blue-grass and bluegrass were undertaken as part of the post-wet season surveys in June 2020. While the survey period is later than the typical flowering season for king blue-grass and bluegrass, the two species can be successfully discerned from other grass species (particularly superficially-similar *Dichanthium* and *Bothriochloa* species) when not in flower through the morphology of the leaves and basal spikelet glumes.

Targeted surveys were undertaken along 12 of the 25 transects previously surveyed in March 2018, including the only two transects with previously confirmed records of the two species. Incidental surveys were also conducted while traversing the site on foot (e.g. while undertaking weed monitoring, rabbit monitoring and pig monitoring plots).

Records of king blue-grass were confirmed from four of the 12 threatened grass survey transects (transect 12, 19, 22 and 25) (Table 7 and Figure 10 to Figure 12), with two incidentally recorded populations in the vicinity of transect 19 and 22 (Figure 11). Eight populations of king blue-grass were recorded along transect 25, where two populations were confirmed in 2018. A further five populations were confirmed from the three other transects, reflecting a total population size of 95-275 tussocks across the 13 populations in four transects. The two king blue-grass population observed outside of the targeted survey transects totalled 52 – 105 tussocks.

Transect number	Number of populations recorded	Population size range	Population per transect
12	1	5-20	5-20
19	1	20-50	20-50
22	3	5-20	15-60
		5-20	
		5-20	
25	8	2-5	55-145
		2-5	
		2-5	
		2-5	
		2-5	
		5-20	
		20-50	

Table 7: King blue-grass populat	ions and their estimated	size at the MDS Project site.
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Transect number	Number of populations recorded	Population size range	Population per transect
		20-50	
Incidental	2	2-5	52-105
observations		50-100	

Records of bluegrass were confirmed from one of the 12 threatened grass survey transects (transect 07), with six incidentally recorded populations (Table 8, Figure 10 and Figure 11).

Four populations of bluegrass were recorded along transect 7, where two populations were confirmed in 2018. The four populations along transect 7 comprised a total population size of 150 - 220 tussocks. The six bluegrass populations observed outside of the targeted survey transects totalled 59 - 140 tussocks.

Previous surveys in 2018 confirmed the presence of a previously undescribed species of *Dichanthium* with the interim name *Dichanthium sp. affine. serecium*. Given the subtleties in difference between the undescribed species and *Dichanthium setosum*, mostly relating to morphological differences in flower morphology, the observed populations could not easily be delineated so were instead assumed to be *Dichanthium setosum*. Investigations into the morphological attributes of the two species is currently underway by the Queensland Herbarium. Once formally described, delineation of the two species will be more readily possible during the flowering season.

Transect number	Number of populations recorded	Bluegrass population size range	Population per transect
7	4	15-20	150-220
		100+	
		20-50	
		20-50	
Incidental observations	6	2-5	59-140
		2-5	
		5-10	
		10-20	
		20-50	
		20-50	

Table 8: Bluegrass populations and their estimated size from transects at the MDS Project site.

The full results of targeted surveys for king blue-grass and bluegrass are presented in the Post-wet Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2020) in Appendix C.

4.3.6 Weed Monitoring

The MNESMP requires that weed monitoring be undertaken every two years, with a survey during the dry season and a survey post-wet season. Accordingly, weed monitoring surveys were undertaken as part of dry season surveys in December 2019 and post-wet season surveys in June 2020. These surveys represent the first weed surveys since the baseline survey in December 2017. The full results of weed monitoring surveys are presented in the Dry Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2019) and the Post-



wet Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2020) in Appendix C and Appendix D respectively.

The results of the weed monitoring indicate that on average there was a higher species richness of weeds during the June 2020 survey undertaken post-wet season, than the baseline and December 2019 surveys, undertaken in the dry season (Table 9). Similarly, the percentage weed cover was on average higher during the June 2020 surveys. This is possibly a consequence of the more favourable conditions promoting weeds post-wet season in 2020.

Table 9: Comparison of weed survey results

	2017 baseline – December 2017	2019 dry season – December 2019	2020 post-wet season – June 2020
Total number of weed species	16	19	24
Average weed species per plot (range)	2.9 (0 – 9)	3.2 (1 – 5)	5.2 (1 – 13)
Average weed cover per plot (range)	7.1% (0 – 54.4)	4.8% (0.3 – 12.6)	13.3% (1.1 – 76.2)

Figure 13 and Figure 14 shows the number of weed species per site and percentage (%) weed cover per site from the three weed surveys undertaken to date. Most notably, the greatest number of weed species and weed coverage was recorded from Site 09 on the edge of Naroo Dam during the 2020 post-wet season surveys (13 species and 76% coverage). The most prelevant weed at this site was Lippia (*Phyla canescens*) which represented 42.8% of the weed coverage at the site. While not a prohibited or restricted invasive plant under the Queensland *Biosecurity* Act, lippia is a serios environmental and pastoral weed that is well adapted to riparian and floodplain environments (Department of Agriculture and Fisheries 2020). It forms a dense mat like ground cover and can outcompete both native and pasture species.



Figure 10 Location of king blue-grass and bluegrass recorded on the MDS Project site during the post-wet season surveys DATA SOURCE: The folowing datasets are © State of Qld: - Mining Lease The following datasets provided by Sojitz - Disturbance areas - Habitat for king blue-grass and bluegrass

Mining Lease Grass survey transects Additional observations Z Disturbance areas Transect not surveyed Dichanthium queenslandicum No threatened grasses - Access tracks Dichanthium setosum Habitat for King blue-grass and bluegrass King blue-grass Threatened grass survey area - Bluegrass Brisbane 0 0.25 0.5 0.75 Kilometres Australia Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:27,500@A3

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Figure 13: Number of weed species per site from the 2017 baseline, 2019 dry season and 2020 post-wet season surveys



Figure 14: Percentage (%) weed cover per site from the 2017 baseline, 2019 dry season and 2020 post-wet season surveys

4.3.7 Pest Animal Monitoring

The MNESMP requires that pest animal monitoring be undertaken every two years, with a survey during the dry season and a survey post-wet season. Accordingly, pest animal monitoring was undertaken as part of dry season surveys in December 2019 and post-wet season surveys in June 2020. The full results of pest animal surveys are presented in the Dry Season Monitoring Report – Year 3 (2019/2020) (CO2 Australia 2019) and the Post-wet Season Monitoring Report – Year 3 (2019/2020) in Appendix C and Appendix D respectively.

The presence of European rabbits (*Oryctolagus cuniculus*), brown hares (*Lepus europaeus*), feral pigs (*Sus scrofa*), feral cats (*Felis catus*) and wild dogs (*Canis familiaris/lupus*) have all been confirmed from the pest animal monitoring plots and/or fauna camera stations established on the MDS project site. Additionally scats from feral goat (*Capra hircus*) were opportunistically recorded during the 2020 dry season surveys outside of a weed monitoring plot.



Table 10 presents the Catling Index scores (a measure of pest animal presence/activity) for the 2017 baseline, 2019 dry season and 2020 post-wet season surveys. The Catling Index scores are based on the results from the fauna camera trap stations. The highest Catling Index score recorded was 22.1, which was for feral dogs during the 2020 post wet season surveys. Feral pigs have never been detected at the fauna camera trap stations so have a Catling Index score of 0. Similarly, feral cats have not been recorded since the baseline surveys.

Pest animal	2017 baseline – December 2017	2019 dry season – December 2019	2020 post-wet season – June 2020
Wild dog	11.7	4.4	22.1
Feral cat	15	0	0
European rabbit	3.3*	4.4	2.9
Brown hare	3.3*	2.2	14.7
Pig	0	0	0

Table 10: Catling Index for pest animals at the MDS Project site

* Sand track stations were used instead of camera traps for the baseline surveys and as such the tracks of rabbits and hares could not be distinguished from one another.

Figure 15 illustrates the change in the Catling Index scores over the three survey events. There was a decline Catling Index scores for all pest animals, with the exception of the rabbit, between the baseline surveys in December 2017 and the dry season surveys in December 2019. There was a marked increase however in the Catling Index scores for the wild dog and brown hare between the dry season surveys in 2019 and the postwet season surveys in 2020.



Figure 15: Graphical representation of the change in Catling Index between the 2017 baseline, 2019 dry season and 2020 post-wet season surveys



In addition to the monitoring of pest animal activity at the camera trap stations, evidence of pig and rabbit/hare activity has also been monitored at pest animal monitoring plots over the three survey events. As demonstrated in Table 11, evidence of pig and rabbit/hare activity at the pest animal monitoring plots increased between the baseline surveys and the 2019 dry season and 2020 post-wet season surveys.

Pest animal	2017 baseline – December 2017	2019 dry season – December 2019	2020 post-wet season – June 2020
Pigs	0%	87%	87%
	10%	60%	60%
Dabbit /bara	9 x Acceptable	4 x Acceptable	6 x Acceptable
Rabbit/Hale	1 x Monitor closely	4 x Monitor closely	3 x Monitor closely
	0 x Unacceptable	2 x Unacceptable	1 x Unacceptable

	Table 11: Percentage of plots fro	m which the pest animal was	detected, and rabbit impact results.
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4.3.8 Biomass Monitoring

In accordance with the MNESMP, biomass monitoring is to be conducted at the end of the dry season and post-wet season. To date, biomass monitoring has been conducted at the end of dry season in December 2018 and post-wet season in June 2019 and in June 2020.

Biomass has been assessed using the Brigalow Belt pasture photo standards. At several of the monitoring sites however, a different photo standard has been used each survey event to assess biomass. For example at site 7, biomass was assessed using the downs photo standard in the 2018 dry season surveys, the narrow-leafed iron bark photo standard in the 2019 post wet season surveys and the bluegrass, wiregrass photo standard in the 2020 post wet season surveys. Consequently, there is the potential for variability in the interpretation of biomass across the survey events. It is recommended that the photo standards used during the 2020 post-wet season survey is used herein as it is considered to most accurately reflect the vegetation communities observed.

Table 12 shows a comparison of biomass monitoring results and the photo standards used to assess biomass.

To ensure consistency over future monitoring events, it is recommended that the MNESMP be updated to include the relevant photo standard that each site should be assessed against (Section 7).

Photo monitoring	RE type	2018 dry season – December 2018		2019 post-we June 2019	t season –	2020 post-wet season – June 2020		
site		Photo standard used	Biomass (kg/ha)	Photo standard used	Biomass (kg/ha)	Photo standard used	Biomass (kg/ha)	
1	11.8.5	Eucalypt woodland	2500	Downs	5040	Eucalypt woodland	3050	
2	11.8.11	Bluegrass, wiregrass	2710	Downs	5040	Downs	5040	
3	11.8.5	Eucalypt woodland	1800	Downs	5040	Eucalypt woodland	2500	

Table 12: Results of biomass monitoring on the MDS Project site and the photo standard used to assess biomass



Photo monitoring	RE type	2018 dry season – December 2018		2019 post-wet season – June 2019		2020 post-wet season – June 2020		
Site		Photo standard used	Biomass (kg/ha)	Photo standard used	Biomass (kg/ha)	Photo standard used	Biomass (kg/ha)	
4	11.8.11	Bluegrass, wiregrass	2710	Downs	5040	Downs	3850	
5	11.8.5	Eucalypt woodland	3600	Downs	5040	Eucalypt woodland	2500	
6	11.8.11	Bluegrass, wiregrass	2710	Downs	3850	Downs	5040	
7	11.4.3	Downs	3015	Narrow- leafed ironbark	310	Bluegrass, wiregrass	2230	
8	11.8.11	Bluegrass, wiregrass	2710	Downs	5040	Downs	5040	
9	11.3.3a	Alluvial	1940	Alluvial	2560	Alluvial	3405	
10	11.8.5	Eucalypt woodland	2500	Downs	5040	Eucalypt woodland	2500	

4.3.9 Dust Deposition Monitoring

As per the MNESMP, dust deposition is monitored in accordance with the MDS Project's EA. This involves monitoring of dust deposition:

- in accordance with the Australian Standard AS3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited Matter – Gravimetric method
- when requested by the administering authority or as a result of a complaint
- > at a location relevant to the potentially affected dust sensitive place.

In addition to the above, Sojitz Blue has installed dust deposition gauges in areas of MNES habitat that may be potentially impacted by dust deposition from Project activities. The results from the dust deposition monitoring at these sites during the 2019/2020 reporting period are presented in Table 13.

The performance criteria relating to dust deposition in the MNESMP requires that dust deposition not exceed 120 mg/m²/day, averaged over one month. As the results of the dust monitoring from the 2019/2020 reporting period are based on total dust deposition over a month, it is difficult to determine whether this performance criteria has been achieved.

Observations made during the general site inspections indicate no obvious evidence of impacts attributable to dust deposition on king blue-grass, bluegrass or other vegetation communities (Section 4.3.2).



		Total Solids (g/m ² /month)							
Site	MNES habitat represented by the site	9 July 2019 to 6 August 2019	6 November 2019 to 5 December 2019	2 March 2020 to 2 April 2020	2 April 2020 to 30 April 2020	13 May 2020 to 11 June 2020			
DMS1	Natural grassland TEC, king blue-grass and bluegrass habitat	1.9	2.7	6.4	-	4.9			
DMS2	Natural grassland TEC, king blue-grass and bluegrass habitat	6.0	3.1	4.3	-	3.3			
DMS3	Squatter pigeon	2.7	2.4	7.2	-	9.9			
DMS4	Australian painted snipe	2.1	2.5	5.2	-	4.5			
DMS5	Brigalow TEC	2.2	2.3	5.6	-	3.4			
DMS6	Squatter pigeon	1.7	3.1	4.2	-	3.6			

Table 13: Results of dust monitoring in MNES habitat during the 2019/2020 reporting period

4.3.10 Noise and Vibration Monitoring

Noise and vibration monitoring generated by activities at the MDS Coal Project is to be monitored in accordance with conditions D1, D2 and D3 of the project's EA. Under the Project's EA, noise and vibration monitoring was not required to be undertaken during the 2019/2020 reporting period.

4.3.11 Water Level and Quality Monitoring

In accordance with the MNESMP, monitoring of the water level and water quality of Naroo Dam has been undertaken in accordance with the conditions of the Project's EA and the make good water agreement with Glencore Coal Queensland Pty Ltd (Glencore).

Figure 16 shows the water levels in Naroo Dam since monthly monitoring commenced in December 2017. Water levels during this time have ranged between 238.4 m AHD and 241.7 m AHD. The Naroo Dam area of inundation extends into the MDS Project site when the dam is very full—specifically, when the dam exceeds 242m AHD (WRM, 2014). These levels have not been reached over this time.





Figure 16: Water levels in Naroo Dam.

Results from the water quality monitoring undertaken in Naroo Dam are provided Table 14. Water quality in Naroo Dam is required to meet the industrial water specifications listed in the make good agreement. All water quality samples taken since the commencement of monitoring in November 2017 have met the industrial water specifications with the exception of pH which was exceeded in the November 2017, March 2018, July 2018, December 2018 and March 2019 events.



Table 14: Water quality in Naroo Dam									
Parameter	Unit of measurement	Industrial Water Specifications (as per the make good water agreement)	Sampling Event						
			27/11/2017	26/03/2018	17/07/2018	11/12/2018	12/03/2019	02/03/2020	09/06/2020
рН	-	6.5 (minimum), 9.0 (maximum)	9.58	9.10	9.46	9.18	9.55	7.97	8.94
Electrical conductivity	μS/cm	<5000	610	965	1290	1500	2110	276	538
Total suspended solids		-	32	54	73	76	76	20	<5
Sulfate (SO ₄)	mg/L	-	26	<1	<1	8	25	2	7
Ammonia as N	mg/L	-	0.077	0.04	0.05	0.07	0.06	0.02	<0.01
Nitrate as N	mg/L	-	0.081	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Dissolved metals									
Aluminium	mg/L	5	0.02	0.01	<0.01	0.01	<0.01	0.01	<0.01
Arsenic	mg/L	0.5	0.001	0.002	0.002	0.003	0.005	<0.001	<0.001
Beryllium	mg/L	-	<0.001	<0.001	-	-	-	-	-
Barium	mg/L	-	0.012	0.024	-	-	-	-	-
Cadmium	mg/L	0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cobalt	mg/L	1	0.001	<0.001	0.002	0.001	0.002	<0.001	<0.001
Copper	mg/L	-	<0.001	0.001	0.002	0.004	0.005	0.002	0.002
Lead	mg/L	0.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	mg/L	-	0.009	0.004	0.002	0.001	<0.001	0.002	0.001
Molybdenum	mg/L	-	0.001	0.002	0.003	0.003	0.007	<0.001	<0.001
Nickel	mg/L	1	0.004	0.005	0.005	0.008	0.006	0.012	0.006
Selenium	mg/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01


Parameter	Unit of	Industrial Water	Sampling Eve	nt					
	measurement	Specifications (as per the make good water agreement)	27/11/2017	26/03/2018	17/07/2018	11/12/2018	12/03/2019	02/03/2020	09/06/2020
Silver	mg/L	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Uranium	mg/L	-	<0.001	<0.001	<0.001	0.001	0.003	<0.001	<0.001
Vanadium	mg/L	-	0.03	0.01	0.04	0.04	0.08	<0.01	0.01
Zinc	mg/L	1	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Boron	mg/L	-	0.05	0.12	0.14	0.18	0.22	<0.05	<0.05
Iron	mg/L	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total petroleum hydrocar	bons		·						
C6 – C10 Fraction	μg/L	-	<20	<20	<20	<20	<20	<20	<20
C10 – C16 Fraction	μg/L	-	<50	<50	<100	<100	<100	<100	<100
C16 – C34 Fraction	µg/L	-	140	820	480	120	370	<100	<100
C34 – C40 Fraction	µg/L	-	<50	880	<100	<100	<100	<100	<100
C10 – C40 Fraction (sum)	µg/L	-	140	1700	480	120	370	<100	<100

Values highlighted in blue exceed the Industrial Water Specifications (as per the make good water agreement)



5 ADHERENCE TO PERFORMANCE CRITERIA

squatter pigeon, in

particular Naroo Dam.

Table 15 provides an assessment of the adherence to the performance criteria set out in the MNESMP. It also includes details of any corrective actions that have been undertaken, or will be undertaken, based on the monitoring results obtained during the reporting period.

ble 15. Adherence to	performance criteria		
Dbjectives for habitat nanagement	Performance Criteria	Adherence to performance criteria	Corrective action
Limit or avoid loss of MNES/ habitat for MNES.	Clearing of MNES/ habitat for MNES does not occur outside of the Project footprint and does not exceed the disturbance limits detailed in the MNESMP.	As detailed in Section 4.3.1, clearing of MNES habitat has not exceeded the disturbance limits in the MNESMP. Clearing has however occurred outside of the Project footprint as a result of changes to the Project footprint.	Corrective action required. The MNESMP should be updated with the current MDS Project footprint and the actual disturbance limits presented in Table 1 of the MNESMP should be recalculated and revised if required. The revised MNESMP should be submitted to DAWE under Condition 18 of the EBPC Act approval.
	No clearing of Brigalow TEC.	As demonstrated in Table 4, Brigalow TEC has not been cleared.	No corrective action required.
	No net loss of habitat for the Australian painted snipe.	As detailed in Section 4.3.1, no habitat for the Australian painted snipe has been cleared by the project during the 2019/2020 reporting period. Therefore there has been no net loss of habitat on the MDS Project site. Habitat for the Australian painted snipe around Naroo Dam has reduced since the baseline surveys in December 2018. This is despite	No corrective action required.
		the dam levels being similar at the time of the surveys.	
	No loss of permanent water sources for the	As detailed in Section 4.3.11, water levels in Naroo Dam are being monitored as part of the make good agreement with Glencore. Since	No corrective action required.

monitoring commenced in December 2017, water levels during this

No other sources of permanent water have been identified onsite.

time have ranged between 238.4 m AHD and 241.7 m AHD.

Table 15: Adherence to performance criteria



Objectives for habitat management	Performance Criteria	Adherence to performance criteria	Corrective action
	Known king blue-grass and bluegrass specimens located outside of the Project footprint will not be cleared as a result of the Project.	None of the known king blue-grass and bluegrass populations located outside of the MDS Project footprint have been cleared as a result of MDS Project activities. As detailed in Section 4.3.5, targeted surveys for king blue-grass and bluegrass were undertaken during the 2020 post-wet season surveys. This included surveys of the two transects with previously confirmed records of the two species. Populations of king blue-grass and bluegrass were recorded from the transects with the previously confirmed records as well as along several other transects. A number of populations outside of the transects were also incidentally recorded.	No corrective action required.
	Rehabilitation of disturbed areas, namely the mine pit and overburden areas, to native ecosystems.	As detailed in Section 4.2.7, rehabilitation works on the areas of the overburden dump are planned to commence next reporting period. Operational works are still continuing in the mine pit and as such, do not require rehabilitation yet.	No corrective action required.
2. Prevent the decline of habitat quality for retained habitat within the Project site.	Maintain or improve habitat quality score in areas of retained MNES/ habitat for MNES, in relation to baseline scores.	As detailed in Section 4.3.4, the habitat quality scores for all MNES, with the exception of the Australian painted snipe, declined during the 2019/2020 reporting period. It is most likely that the decline in the habitat quality scores is due to the exceptionally dry conditions, preceding, and at the time of the surveys in 2019 (Section 3).	No corrective action required at this stage. It is recommended that ongoing monitoring is to be undertaken in accordance with the MNESMP to ensure that the decline in habitat is related to climatic conditions at the time of the survey and not Project related activities.
3. Minimise risk of weed introduction and/or spread in areas of MNES/ habitat for MNES.	 No new weed species are established in areas of MNES/ habitat for MNES based on baseline data. 	As detailed in Section 4.3.6, the results of the weed monitoring indicate that there has been an increase in both the number of weed species and weed cover since the baseline surveys.	Corrective action required. Corrective action required for control of newly identified weed species and ongoing management of previously confirmed weeds.
	 No spread of existing weed infestations as determined during baseline surveys. 		



Objectives for habitat management	Performance Criteria	Adherence to performance criteria	Corrective action
4. Reduce degradation of MNES/ habitat for MNES by pest animals, and reduce potential predation of squatter pigeon and Australian painted snipe by pest animals.	 Reduction in pest animal numbers in areas of MNES/ habitat for MNES below baseline levels. No new pest animal species are established in areas of MNES in comparison to baseline data. 	As detailed in Section 4.3.7, there has been an increase in pest animal activity from baseline levels, particularly during the most recent post- wet season surveys. Additionally, scats from feral goat (<i>Capra hircus</i>), which had not been previously recorded on the MDS Project site, were opportunistically recorded during the 2019 dry season surveys.	 Corrective action required. In accordance with the MNESMP, the following corrective actions are recommended to be undertaken: Conduct an investigation into potential sources or reasons that may have attributed to an increase in pest animal abundance or species (e.g. mine site waste management practices increasing predator prey and predators). Review adherence to MDS Project Weed and Pest Management Plan. Increase frequency and intensity of pest animal control on the MDS project site.
5. Minimise impact of dust deposition on MNES/ habitat for MNES as a result of the construction and/or operation of the Project.	Dust deposition must not exceed 120 mg per square metre per day, averaged over one month when measured at any sensitive receptor.	The results of the dust monitoring from the 2019/2020 reporting period are based on total dust deposition over a month. Therefore, it is difficult to determine whether this performance criteria has been achieved. Observations made during the general site inspections indicate no obvious evidence of impacts attributable to dust deposition on king blue-grass, bluegrass or other vegetation communities.	No corrective action required.
6. Minimise degradation of	No uncontrolled fire within the Project site.	No uncontrolled fires have occurred on the MDS Project site.	No corrective action required.
MNES/ habitat for MNES as a result of increased risk of fire due to Project activities and management actions.	If required, controlled burns in RE 11.8.11 (natural grasslands TEC, potential blue grass and king blue-grass habitat) occur at an interval greater than 5 years.	No controlled burns have been undertaken in RE 11.8.11 during this reporting period.	No corrective action required.



Objectives for habitat management	Performance Criteria	Adherence to performance criteria	Corrective action
	 If required, controlled burns in RE 11.8.5 and 11.8.15 (squatter pigeon habitat) occur every 6 – 10 years. 	No corrective action required.	
	 No controlled burns within Brigalow TEC. 	No controlled burns have been undertaken in the Brigalow TEC.	No corrective action required.
7. Minimise degradation of habitat for the Australian painted snipe and squatter pigeon as a result of changes to water quality in Naroo Dam.	Water quality does not exceed trigger levels set out in Table F8 of the Project's EA, at any of the monitoring sites listed in Table F7 of the Project's EA.	Since the approval of the MNESMP Condition F19 (containing Tables F7 and F8) in the Project's EA has been amended and the requirement to monitor in Naroo Dam as well as a number of other sites has been removed. As detailed in Section 4.3.11, water quality in Naroo Dam has not exceeded the industrial water specifications in make good agreement during the 2019/2020 reporting period.	No corrective action required.
8. Minimise noise and vibration impacts in areas of squatter pigeon and Australian painted snipe habitat.	When measured, noise and vibration levels do not exceed criteria set out in Tables D1 and D2 of the Project EA.	Monitoring of noise and vibration levels are to be undertaken in accordance with the Project's EA. As detailed in Section 4.3.10, noise and vibration monitoring was not required to be undertaken during this reporting period.	No corrective action required.
9. Minimise potential for mortality or injury to squatter pigeons and Australian painted snipe as a result of the construction and operation of the Project (e.g. from clearing activities, vehicle strikes etc).	No mortalities or injuries of squatter pigeons or Australian painted snipes as a result of the construction and operation of the Project (e.g. from clearing activities, vehicle strikes etc).	There have been no recorded mortalities or injuries of squatter pigeons or Australian painted snipes as a result of the construction and operation of the MDS Project.	No corrective action required.



6 POTENTIAL THREATS AND RISKS

Vegetation clearing works continue to pose the greatest risk to MNES and their habitat in the MDS Project site. To mitigate this risk, the measures outlined in the MNESMP will be adhered to. This includes the provision of environmental awareness training for all personnel, monitoring of vegetation clearing impacts and clearing only within the MDS Project footprint.

The results of the 2019/2020 dry season and post-wet season surveys also indicate that there is a potentially increased threat from weeds and pest animal. Increases in pest animals including feral pigs, European rabbits and brown hares have the potential to impact MNES through habitat degradation, while wild dogs are a known threat to squatter pigeon. Similarly, increased numbers of weed species and weed coverage on the MDS project site has the potential to impact MNES and MNES habitat.

Ongoing management and monitoring activities will provide an indication of the efficacy of management actions in achieving the performance criteria set out in the MNESMP.

7 AMENDMENTS TO MNESMP

Figure 17 illustrates the overarching management process for the MNESMP, which is based on an adaptive management approach. This management process is an ongoing cycle of implementation, learning and review. In accordance with the adaptive management approach, and to incorporate the outcomes of the MNESMP monitoring program and the results outlined in this annual report, the following amendments are recommended to be made to the MNESMP:

- Update the MNESMP with the current MDS Project footprint including recalculating and revising the actual disturbance limits presented in Table 1 of the MNESMP if required.
- Amend the biomass method to ensure consistent photo standards are used. Also amend the biomass method to allow flexibility such that where the observed biomass at a given site is mid-way between two photos within a given biomass standard, the middle of the corresponding range can be reported if more representative (i.e. observed biomass between 2,500 kg/ha and 3,600 kg/ha 'Eucalypt woodlands' photo standards can be reported as 3,050 kg/ha).

While not an amendment to the MNESMP, as such, it is also recommended the environmental awareness training be updated to address the specific requirements of the MNESMP. This includes specific topics on MNES, risks and protective measures.

Once amended, the revised MNESMP will be submitted to DAWE under Condition 18 of the EPBC Act approval.





Figure 17: Management process



8 MANAGEMENT, MONITORING AND REPORTING SCHEDULE – 2020/2021

To guide management, monitoring and reporting activities for the 2020/2021 reporting period, Table 16 outlines a schedule of the management, monitoring and reporting activities to be undertaken as part of the MNESMP.

Table 16: Management, monitoring and reporting activities for the 2020/2021 reporting period

			2020					2021						
Action	Timing		August	September	October	November	December	January	February	March	April	May	June	
Management														
Provision of mapping of MNES habitat to clearing personnel and contractors	Prior to vegetation clearing works													
Provision of environmental awareness training to all personnel and contractors	During site inductions													
Implementation of permit to disturb system	During vegetation clearing works													
Demarcation of areas of MNES habitat adjacent to clearing areas	During vegetation clearing works													
Implementation of weed and pest management plan	During construction and operations													
Progressive rehabilitation of disturbed areas as per the Environmental Management Plan	During construction and operations	At all times												
Implementation of dust suppression techniques in accordance with the <i>Coal</i> <i>Mining Safety and Health Act 1999</i> and Coal Mining Safety and Health Regulation 2017	During construction and operations													
Prevention, preparedness and management of fire hazards in accordance with the <i>Coal</i> <i>Mining Safety and Health Act 1999</i> and Coal Mining Safety and Health Regulation 2017	During construction and operations													



			2020					2021					
Action	Timing	yılı	August	September	October	November	December	January	February	March	April	May	June
Enforcement of speed limits on internal roads	During construction and operations												
Monitoring													
Monitoring of vegetation clearing impacts on MNES	Quarterly		~			~			~			~	
Audit of the permit to disturb system	Quarterly		~			~			~			~	
Visual inspections of Brigalow TEC	Quarterly		~			~			~			~	
Visual inspections of king blue-grass and bluegrass populations	Biannually			~						~			
General site inspections	Biannually		✓						~				
Habitat condition assessments	Annually, during the same season as baseline assessments						~						
Photo monitoring	Annually, at the same time as the habitat condition assessments						~						
Targeted surveys for king blue-grass and bluegrass	Annually						~						
Pest animal monitoring	Every second year – not required in the next reporting period												
Weed monitoring	Every second year – not required in the next reporting period												
Biomass monitoring	End of each wet and dry season			~							~		
Dust monitoring	As required by the Project EA												



			2020					2021						
Action	Timing	ylul	August	September	October	November	December	January	February	March	April	May	June	
Noise and vibration monitoring	As required by the Project EA													
Water level monitoring of Naroo Dam	Monthly as required by the make good agreement with Glencore	✓	✓	~	~	✓	✓	✓	~	✓	~	~	√	
Water quality monitoring	Quarterly, as required by the make good agreement with Glencore			~			~			✓			√	
Reporting												·		
Review of the MNESMP	Annually	\checkmark												
Annual report	Annually, required to be submitted to DAWE by the 30 June												✓	



9 REFERENCES

CO2 Australia (2020). *Dry Season Monitoring Report – Year 3 (2019/20)*. A report prepared for Sojitz Blue Pty Ltd. CO2 Australia Limited, Brisbane.

CO2 Australia (2020). *Post-wet Season Monitoring Report – Year 3 (2019/20)*. A report prepared for Sojitz Blue Pty Ltd. CO2 Australia Limited, Brisbane.

Department of Agriculture and Fisheries (2020) *Lippia – Condamine couch/curse –* Phyla canescens. Available from: <u>https://www.daf.qld.gov.au/___data/assets/pdf_file/0007/59146/lippia.pdf</u>

Sojitz Coal Mining Pty Ltd (2018) Meteor Downs South Weed and Pest Management Plan.

WRM (2014) *Meteor Downs South Project Surface Water Impact Assessment*. Report prepared for U&D Mining Industry (Australia) Pty Ltd.



APPENDIX A ENVIRONMENTAL AWARENESS TRAINING

Environmental Protection



Add a caption

Environmental Management on site is Sojitz Minerva Mine's responsibility with all activities carried out and maintained by Minerva Mine and its contractors.

The Environmental Management System (EMS) controls all of this, covering off the areas of:

- Rehabilitation
- Water
- Land
- Hydrocarbon and Chemicals
- Energy
- Waste
- Biodiversity.



Land Disturbance, topsoil stripping and rehab form one large process through which we aim to return the land we are mining to a self sustaining environment and pasture (grazing).

Things to know:

Add a caption

- Report any spills (1. contain, 2. Report and 3. Clean)
- New ground cannot be disturbed without first checking with the environmental department
- Topsoil management is a critical aspect with many controls around how we conduct topsoil stripping, sampling and placement on rehab areas or stockpiles
- Rehabilitation works are controlled through a detailed Quality Assurance (QA) and sign off structure to ensure all works meet client requirements.

Waste Management

- Correct waste into the correct bins
- Bins for waste management vary from wheelie bins to 15m skips
- Put the right waste into the right bins, minimising "contamination" of waste streams.





APPENDIX B GENERAL SITE INSPECTION RECORD FORMS



INSPECTION
RECORD
FORM
AREA: General Site Inspection

APPROVED	
PAGE	1 OF 1
SITE	MDS
EXPIRY	

SECTION 1 – INSPECTION DETAILS

NAME: Alec Richards DATE: 04/12/2019 PHONE: 0438772012

INSTRUCTIONS: As per MNESMP Table 22: Mitigation, management and monitoring requirements for MNES. A bi-annual inspection of the site is required.

This is a record of that inspection.

NOTE:

Access tracks include, the tracks used for accessing monitoring points and the main site accesses.

Firebreaks include all those cleared regularly.

Fence lines are only assessed near the tracks/breaks listed above.

SECTION 2 – INSPECTION FINDINGS

No change to condition of area.

Weed infestations (parthenium) along parts of access tracks and firebreaks (mainly dead)

Firebreaks are in good condition (completed in September) - Grader works planned for May/June

Photos on file of conditions.

Image 8607 in the GSI folder shows fence line slightly falling along the north-western boundary

SECTION 3 – NEXT INSPECTION DUE MAY 2020



INSPECTION
RECORD
FORM
AREA: General Site Inspection

APPROVED	
PAGE	1 OF 2
SITE	MDS
EXPIRY	

SECTION 1 – INSPECTION DETAILS

NAME: Alec Richards DATE: 30/06/2020 PHONE: 0438772012

INSTRUCTIONS: As per MNESMP Table 22: Mitigation, management and monitoring requirements for MNES. A bi-annual inspection of the site is required.

This is a record of that inspection.

NOTE:

Access tracks include, the tracks used for accessing monitoring points and the main site accesses.

Firebreaks include all those cleared regularly.

Fence lines are only assessed near the tracks/breaks listed above.

SECTION 2 – INSPECTION FINDINGS

No change to condition of area.

Weed infestations (parthenium) along parts of access tracks and firebreaks (dry/dead)

Firebreaks are complete in most areas. Fire break along the Eastern side of the mine lease, adjacent to the ROM requires grading (refer IMG0008). Western boundary requires a second blade wide graded in some sections up to the MIA (see photos).

Photos on file of conditions.

Image 0009 in the GSI folder shows fence condition along the north-western boundary has worsened since the previous inspection – works required on fence.



Figure 1: North-western boundary section of fence which requires maintenance.



Figure 2: Eastern Boundary which requires grading up along old fenceline up to the ROM.



Figure 3: Western Boundary section which requires a second blade graded through.

SECTION 3 – NEXT INSPECTION DUE DECEMBER 2020



APPENDIX C DRY SEASON MONITORING REPORT – YEAR 3 (2019/20) (CO2 AUSTRALIA 2020)



Dry Season Monitoring Report – Year 3 (2019/20) MDS and Lexington

Meteor Downs South Coal Mine Project Sojitz Blue Pty Ltd





Rev	Date	Description
0	21 January 2020	First draft issued to client
1	3 March 2020	Finalised based on client review
2	18 August 2020	Final issued to client

	Name	Position	Date
ORIGINATORS	Julian Radford-Smith Dr Jarrad Cousin Tara D'Arcy-Evans	Consultant Senior Ecologist Consultant	3 March 2020
APPROVER	Christopher Ewing	Senior Project Manager	3 March 2020

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1 INTRODUCTION

U&D Mining Industry (Australia) Pty (U&D) has approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to develop and operate the Meteor Downs South (MDS) Coal Mine Project (the Project) (Figure 1). U&D is in a joint venture with Sojitz Blue Pty Ltd (Sojitz Blue) to develop and operate the Project.

Under the Project EPBC Act approval (EPBC 2013/6779), the Project has prepared the following documents:

- Matters of National Environmental Significance Management Plan (MNESMP)
 - to address EPBC 2013/6779 conditions 2, 3 and 4 with respect to the direct and indirect impacts of the Project on matters of national environmental significance (MNES) at the Project site
- Offset Management Plan (OMP)
 - to address EPBC 2013/6779 conditions 5 and 6 with respect to environmental offsets at the Lexington offset site (Figure 1) for significant residual impacts of the MDS Project on MNES and matters of state environmental significance (MSES)

The MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 1. The baseline (Year 1) management periods for the Project site and the Lexington offset site are considered to be June 2017 – June 2018 (Project site) and October 2017 – October 2018 (Lexington offset site).

Consequently, the current report is the Year 3 (2019/2020) dry season monitoring report for both the Project site and the Lexington offset site.

Site	Monitoring activity	Management Plan	Frequency	Timing
MDS	Habitat condition assessment	MNESMP Section 13.3	Annual	Dry season
Project site	Photo monitoring	MNESMP Section 13.4	Annual	
	Targeted surveys for king blue- grass and bluegrass	MNESMP Section 13.5	Annual	
	Habitat availability assessment for Australian painted snipe	MNESMP Section 13.6	Every 2 years	Wet season or following inundation event
	Pest animal monitoring	MNESMP Section 13.7	Every 2 years	Dry season and post- wet season
	Weed monitoring	MNESMP Section 13.8	Every 2 years	
Lexington offset site	General offset site monitoring	OMP Section 7.1	Annual	Post-wet season
	Habitat condition assessment	OMP Section 7.2.1	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2039	Post-wet season
	Photo monitoring	OMP Section 7.2.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2039	Post-wet season



Site	Monitoring activity	Management Plan	Frequency	Timing
	Weed monitoring	OMP Section 7.4	Every 2 years	Dry season and post- wet season
	Pest animal monitoring	OMP Section 7.5	Every 2 years (dry season and post wet season surveys)	Dry season and post- wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events



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2 METHODOLOGY

Field surveys were undertaken by two tertiary-qualified ecologists (Andrew Dawson and Julian Radford-Smith) between 10 - 17 December 2019. Permanent monitoring sites were established at each site as part of the baseline surveys carried between December 2017 and April 2018, detailed in the following:

- MNESMP Baseline Monitoring Report Meteor Downs South Coal Mine Project. A report prepared by CO2 Australia in 2017 (CO2 Australia 2017) – baseline monitoring sites established in December 2017
- Lexington Offset Area Initial Baseline Monitoring Report Meteor Downs South. A report prepared by CO2 Australia in 2018 (CO2 Australia 2018) – baseline monitoring sites established in April 2018

2.1 MONITORING LOCATIONS

2.1.1 MDS Project site

Dry season monitoring activities at the Project site comprised:

- Habitat condition assessments
- Targeted squatter pigeon surveys
- Photo monitoring
- Pest animal monitoring
- Weed monitoring.

Table 2 shows activities at each monitoring location at the Project site. A total of 43 permanent sites/plots were monitored across the balance of ML70452 outside of the MDS project (refer to Figure 2 and Figure 3). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 2), according to the following:

- 10 x habitat monitoring sites (100 m x 50 m)
 - collocated with weed and rabbit monitoring plots (Sites 01 10)
- 30 x photo monitoring sites
 - established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 10) and at SW corner of weed monitoring plots (Sites 11 – 20)
- 20 x weed monitoring plots (1 ha)
 - partly collocated with weed and rabbit monitoring plots (Sites 01 10), with remaining 10 sites
 (Sites 11 20) standalone weed monitoring plots
- 10 x rabbit monitoring plots (2 ha)
 - collocated with habitat monitoring sites and weed monitoring plots (Sites R01 R10)
- 8 x pig monitoring plots (15 ha) (Sites P01 P08)
- 15 x pest animal fauna camera stations (Sites C01 C15)
 - Located throughout the site adjacent existing access tracks
 - Replaced the 20 x sand track stations employed previously

At each of the 10 habitat monitoring sites (Sites 01 - 10), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring



plots (Sites 11 - 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-1 in Appendix A for detailed locations of each of the monitoring sites at the Project site.

Habitat monitoring								Pest animal monitoring			
Site	Brigalow TEC	Natural Grasslands TEC	King blue-grass	Bluegrass	Squatter pigeon	Australian painted snipe	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
01					✓		\checkmark	✓	~		
02		✓	\checkmark	✓			\checkmark	✓	✓		
03					✓		\checkmark	✓	✓		
04		✓	\checkmark	✓			\checkmark	✓	✓		
05					~		\checkmark	✓	✓		
06		✓	\checkmark	~			\checkmark	~	✓		
07	✓						\checkmark	~	✓		
08		✓	\checkmark	✓			\checkmark	~	✓		
09						✓	\checkmark	~	✓		
10					✓		\checkmark	~	✓		
11 – 20							\checkmark	~			
P01 – P08										✓	
C01 – C15											\checkmark

Table 2: Monitoring locations at the Project site, surveyed as part of the 2019/20 dry season surveys



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2.1.2 Lexington offset site

Dry season monitoring activities at the offset site comprised:

- Photo monitoring
- Weed monitoring
- Pest animal monitoring

Table 3 shows activities at each monitoring location at the offset site. A total of 43 permanent monitoring sites/plots were monitored across the offset site. Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 2), according to the following:

- 33 x photo monitoring sites
 - 26 established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 13)
 - 7 at SW corner of weed monitoring plots (Sites 14 20)
- 20 x weed monitoring plots (1 ha)
 - 13 sites collocated at all habitat monitoring sites (Sites 01 13),
 - 7 sites (Sites 14 20) standalone weed monitoring plots
- 10 x rabbit monitoring plots (2 ha)
 - collocated with 10 of the habitat monitoring sites (Sites 01-05, 07-08, 10-11 and 13) and weed monitoring plots
- 8 x pig monitoring plots (15 ha) (Sites P01 P08)
- 15 x pest animal fauna camera stations (Sites C01 C15)
 - fauna camera stations were established along pest animal survey tracks

At each of the 13 habitat monitoring sites (Sites 01 - 13), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring plots (Sites 14 - 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-2 in Appendix A for detailed locations of each of the monitoring sites at the Lexington offset site.

Table 3: Monitoring locations	at the Lexington o	ffset site, surveyed as	part of the 2019/20 dr	y season surveys
-------------------------------	--------------------	-------------------------	------------------------	------------------

site	Photo monitoring	Pest an	auna camera station ^{bu} i	
01 – 20	✓			
P01 - P08		~	~	
C01 – C15				✓



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2.2 HABITAT CONDITION ASSESSMENT (PROJECT SITE ONLY)

Habitat monitoring sites were established in December 2017 based on the requirements of the *Guide to determining terrestrial habitat quality* (DEHP 2017). A total of 10 habitat monitoring sites (comprising N_S running 100 m x 50 m transect) were established (Sites 01 - 10), with the start and central points marked with a 1.8 m galvanised steel picket with plastic safety cap (refer to Figure 2 and Figure 3).

Habitat condition assessments for Brigalow TEC, Natural Grasslands TEC, bluegrass, king blue-grass, squatter pigeon and Australian painted snipe were undertaken at the habitat monitoring sites generally in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017). Through the application of the guide, a habitat quality score was calculated for each MNES based on the following key indicators:

- site condition: a general condition assessment of vegetation compared to a benchmark
- site context: an analysis of the site in relation to the surrounding environment
- ▶ fauna species habitat index: the ability of the site to support the given target fauna species.

The species habitat index assessment was assessed for the squatter pigeon and Australian painted snipe, although only included targeted fauna surveys for squatter pigeon given the paucity of habitat in the immediate vicinity of Naroo Dam. The targeted fauna survey for squatter pigeon was undertaken generally in accordance with the *Survey Guidelines for Australia's Threatened Birds* (DEWHA 2010).

In the absence of the *Guide to determining terrestrial habitat quality* (DEHP 2017) including a species habitat index for flora species, the habitat condition scores for the two MNES flora species (king blue-grass and bluegrass) included a species presence index out of three, whereby: 0 = absent/not confirmed, 2 = up to five tussocks confirmed, 2.5 = up to 20 tussocks confirmed, 3 = more than 20 tussocks confirmed. The habitat condition score for the two MNES flora species was then calculated as a combination of site condition and site context for the RE assessment unit (representing 80% of the score), with species stocking rate converted to a score out of 10 and contributing 20%.

2.3 PHOTO MONITORING (PROJECT SITE AND LEXINGTON)

Photo monitoring was undertaken at permanent sites established as part of baseline surveys on the Project site and the offset site to give a representative indication of cover and species composition (including weeds) for the general area and enable visual assessment of habitat changes over time. Photo monitoring sites were established with a 1.8 m galvanised steel picket with plastic safety cap.

At each of the photo monitoring points, five photos were taken from 1.5 m height above ground level looking north, east, south and west with a ground photo taken looking down at an angle of 45° to the northwest of the star picket.

On MDS, photo monitoring was undertaken at 30 sites, including two at each of the 10 habitat condition assessment sites (0 m and 50 m points: Site 01 - 10), with single photo monitoring points at the SW corner of the remaining 10 weed monitoring plots (Site 11 - 20) identified in Table 2 and shown in Figure 2 and Figure 3.

On the Lexington offset site, photo monitoring was carried out at the SW corner star picket of each of the 20 weed monitoring plots, identified in Table 3 and shown in Figure 4 and Figure 5. In addition to visual assessment of habitat changes, photo monitoring at Lexington is also used to monitor biomass within the



offset areas by comparing to relevant photo standards from the Future Beef website¹ in order to manage grazing biomass and minimise risk of unplanned fire.

A record of the photographs for the Project site is shown in Appendix C, with a record of the photographs for the offset site shown in Appendix D.

2.4 WEED MONITORING (PROJECT SITE AND LEXINGTON)

For the purposes of this assessment, weeds were taken as any species of plant not considered by the Queensland Herbarium as being native to Queensland, as well as species of plant not considered locally endemic to the region.

Weed monitoring was undertaken at 20 permanent plots established at the Project site and at the offset site to incorporate natural variability such as aspect (e.g. a mix of north-, east-, south- and west-facing monitoring sites) and community type, while also targeting trafficable areas (e.g. entry gates, creek crossings, stock watering points) to monitor potential introduction and/or irruptions of prohibited and restricted weed species. At each weed monitoring plot, 3 x 100 m transects (traversing in an east-west direction) were traversed, keeping them parallel to one another, 50 m apart.

Figure 2 and Figure 3 show the MDS Project site weed monitoring locations, with Figure 4 and Figure 5 showing the Lexington offset site weed monitoring locations.

At each of the permanent weed monitoring plots, monitoring of weeds was undertaken in accordance with the following method:

- At 10 m intervals along each of the three transects, a 2 m x 2 m plot frame was used to record the presence, species and cover of weeds
- Weed cover at each 2 m x 2 m survey site was recorded as one of five cover classes: 1 = 0%; 2 = 0-5%; 3 = 6-25%; 4 = 26-50%; 5 = 51-100% (Auld 2009)
- An average cover score for each weed species for each 1 ha site was calculated
- The average cover score was then calculated as the average percentage from the 30 plots surveyed from the three 100 m transects
- > The mean cover score across all weed monitoring sites was then calculated.

For the purposes of the calculation of average percentage cover of weeds, each of the five weed cover classes (0-5) were converted to a quantitative weed cover value based on the average value of the range corresponding to that weed cover class, as outlined below:

- Weed cover class 1 (0%) retained a value of 0%
- Weed cover class 2 (0-5%) was converted to a value of 2.5%
- Weed cover class 3 (6-25%) was converted to a value of 15%
- Weed cover class 4 (26-50%) was converted to a value of 37.5%
- Weed cover class 5 (51-100%) was converted to a value of 75%.



In addition to permanent weed monitoring sites, where relevant, incidental observations were collated as part of general site monitoring, recording details of weeds (including location, species and extent) and areas of significant weed cover.

2.5 PEST ANIMAL MONITORING (PROJECT SITE AND LEXINGTON)

For the purposes of this assessment, pest animals are defined as any species of fauna not native to Queensland, nor protected under the *Nature Conservation Act 1992* (Qld; NC Act).

Pest animal monitoring was undertaken through a combination of:

- plot based monitoring, searching for direct presence (e.g. visual confirmation) or indirect evidence (e.g. tracks, diggings, scats, rubbings etc)
- infra-red, motion-detector fauna cameras, representing opportunities to visually confirm the presence of pest animals.

2.5.1 Rabbits

An assessment of the presence and impact of rabbits was undertaken generally in accordance with Cooke *et al.* (1990). Rabbit monitoring plots were established at the same location as habitat monitoring sites and weed monitoring plots (refer to Figure 2 and Figure 3 for locations at project sites and Figure 4 and Figure 5 for locations at the offset site).

Each rabbit monitoring plot consisted of a 2 ha plot which was traversed for 15 to 20 minutes, assessing the following (refer to Cooke *et al.* 1990):

- Rabbit abundance a measure of the presence and number of rabbit warrens and the abundance of any faecal pellets (including 'buck-heaps' or latrines) – measured on a scale of 0 – 5.
- Seedling abundance a measure of the presence and abundance of native vegetation seedlings encountered during the 15-20-minute traverse – measured on a scale of 0 – 5.
- Rabbit damage a measure of seedlings (< 0.5 m height) with evidence of rabbit damage, identified as 45° 'secateurs-like' cuts through smaller stems, defoliation and gnawing of bark measured on a scale of 0 5.</p>

From this assessment, a 'corrected regeneration score' was calculated from the seedling abundance and rabbit damage score in accordance with Table 4. This measure corrects for seedling regeneration as a function of observed rabbit damage and is subsequently used to calculate overall rabbit impact with the rabbit abundance score.

Table 4: Calculation of corrected regeneration score.

	Seedling abundance						
Rabbit damage	0	1	2	3	4	5	
0	0.20	1.00	2.00	3.00	4.00	5.00	
1	0.20	0.50	1.00	1.50	2.00	2.50	
2	0.20	0.34	0.70	1.00	1.30	1.70	
3	0.20	0.28	0.50	0.80	1.00	1.30	
4	0.20	0.20	0.40	0.60	0.80	1.00	
5	0.20	0.20	0.30	0.50	0.70	0.80	


As illustrated in Figure 6, overall rabbit impact was assigned as one of three categories – 'acceptable', 'monitor closely' or 'unacceptable', as determined from a combination of the score for rabbit abundance and the corrected regeneration score. Note that it was assumed that any site with a rabbit abundance score of '0' was assumed to be 'acceptable', irrespective of corrected regeneration score. This is to avoid the situation where, with an absence of rabbits, and a corrected regeneration score of ≤ 2 (attributable to no rabbit damage and less than 20 seedlings), a given site may be identified as one to 'monitor closely' only by virtue of the fact that the few seedlings are attributable to the site being a grassland, rather than it reflecting rabbit grazing.





2.5.2 Fauna camera stations

An assessment of pest animal presence and activity was conducted using infra-red cameras. Infra-red fauna cameras were placed approximately 1.3 m above the ground at 15 fauna camera stations at the MDS Project site, and 15 fauna camera stations at the offset site. Once established, the fauna cameras were left unattended for 3 days/nights to be able to intercept any active fauna using trails in the survey area.

Cameras were represented by 12 Browning Dark Ops 940 HD 16 mega-pixel digital cameras (BTC-6HD-940) and three LTL-6310 Acorn 12 mega-pixel digital cameras (LTL-6310M). Both camera models were supported by 940nm infra-red night vision and motion sensor capabilities to allow for capture of fauna during the day and night.

The camera settings were set to capture a series of images in succession following a motion trigger. If motion continued after this series of images were captured, then the camera would continue to capture images (in sets of four), followed by at least a one-minute pause, after which any new the camera could be



triggered again. Secure Digital (SD) memory cards of 32 gigabyte capacity were used in the cameras for storing captured images.

For each pest animal species, a measure of pest animal presence/activity (Catling Index value) was calculated for the site by summing the number of operable fauna camera stations with evidence of the targeted pest animal by the sum of all operable station days/nights (refer to Mitchell and Balogh 2007a).

Refer to Figure 2 and Figure 3 for locations at project sites and Figure 4 and Figure 5 for locations at the offset site.

2.5.3 Feral pigs

An assessment of the presence of feral pig signs (as a measure of feral pig presence or activity) was undertaken generally in accordance with (Mitchell & Balogh 2007b) and (Hone 1988).

Randomly stratified, 500 m x 300 m (15 ha) plots were established in environments that are more regularly impacted included plots within and traversing ephemeral watercourses. A total of eight pig monitoring plots were established at the project site (Figure 2 and Figure 3) including plots within the immediate vicinity of Naroo Dam in the east of the site. Eight pig monitoring plots were also established at the offset site (Figure 4 and Figure 5), one of which was relocated (P03) following a recommendation in the 2018/19 monitoring report (NRC 2019).

Each 15-ha plot comprised 3 x 500 m transects spaced 100 m apart. At each plot, the following method was used for each of the transects:

- traversing in an east-west direction, surveying for the presence of any feral pig signs (rooting, wallows, dung, footprints, travel pads, plant damage and tree rubs, as well as the physical presence of feral pigs) 1 m either side of the transect in 50 m sections
- calculating an abundance score for each transect as the percentage of 'present' feral pig signs from the 10 sections along the 500 m transect
- calculating the mean abundance score (and variance) across all transects.

2.6 GENERAL OFFSET SITE ASSESSMENTS

Additional, general site monitoring was conducted as part of conducting habitat condition assessments, weed monitoring and pest animal surveys, including:

- Observations of fencing condition, including any repair/upgrades
- Access track conditions, including location of watercourse crossings, grids, erosion, etc
- Fire management, including assessment of existing firebreaks, access tracks and roads, fuel loads, and any recent burning activities
- Livestock management including assessment of signs of land degradation and over-grazing, especially in offset management zone C for of concern RE 11.8.11a and watercourse RE 11.8.11a
- Erosion management, including assessment of the incidence of erosion within the offset site, especially around permanent and semi-permanent water bodies or areas subject to inundation or waterlogging (e.g. areas of RE 11.8.11a)
- Incidental fauna observations, including presence, traces and/or abundance of pest animals. Any additional risks to fauna (i.e. evidence of vehicle strike)



3 RESULTS: MDS PROJECT SITE

3.1 HABITAT MONITORING

Results of the habitat condition assessments identified an average site condition score of 7.14 out of 10 across all ten habitat monitoring sites, with scores ranging between 5.31 (Site 05) and 8.50 (Site 04). Table B-1 and Table B-2 of Appendix B outline details of the site condition assessments, summarised below in Table 5.

Table 5: Project site habitat monitoring sites: site condition and site context scores calculated in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017).

Site	RE	Site condition score (/10)	Site context score (/10)
01	11.8.5	7.56	7.69
02	11.8.11	6.83	6.92
03	11.8.5	7.94	7.69
04	11.8.11	8.50	7.69
05	11.8.5	5.31	7.69
06	11.8.11	6.17	7.31
07	11.4.3	7.00	7.69
08	11.8.11	6.33	7.31
09	11.3.3a	6.00	7.69
10	11.8.5	7.75	7.69
Average score		6.94	7.54

MNES habitat condition assessments

Based on the results of the site condition and assessments, habitat condition scores for the six MNES ranged between 5.38 (Australian painted snipe) and 7.39 (Natural grasslands TEC) out of 10 (Table 6). The comparatively low score for Australian painted snipe habitat is in part attributable to the low site condition for RE 11.3.3a habitat (6.00), but also the low fauna species habitat index (3.20), reflecting an absence of appropriate foraging and shelter habitat for the species at the time of surveying. In contrast, Natural Grasslands TEC habitat had the highest habitat condition score (8.13), attributable in large part to low weed cover and high species richness for grasses at each of the contributing RE 11.8.11 sites (refer to Table B-1 of Appendix B for site condition raw data contributing to site condition score in Table B-2).

Table C. Dre	in at alta man	nitering sites of	houring their	habitat condition	accurate contribution	A to MANIEC
Table 5: Pro	iect site mo	nitoring sites s	nowing their		scores contributin	IS TO IMINES.
						0

Site	RE	Brigalow TEC	Natural Grasslands TEC	King blue- grass	Bluegrass	Squatter pigeon	Australian painted snipe
01	11.8.5					7.08	
02	11.8.11		6.96	5.57	5.57		
03	11.8.5					7.28	
04	11.8.11		8.13	6.50	6.50		



Site	RE	Brigalow TEC	Natural Grasslands TEC	King blue- grass	Bluegrass	Squatter pigeon	Australian painted snipe
05	11.8.5					5.93	
06	11.8.11		7.14	5.71	5.71		
07	11.4.3	7.17					
08	11.8.11		7.32	5.86	5.86		
09	11.3.3a						5.38
10	11.8.5					7.18	
	Average score	7.17	7.39	5.91	5.91	6.87	5.38

Natural Grasslands, king blue-grass and bluegrass habitat

As discussed above, areas of Natural Grasslands TEC, represented by RE 11.8.11, were all in good condition considering the current drought, with habitat condition scores for the four assessment sites ranging between 6.96 and 8.13. The four assessment sites supported three TEC indicator grass species (Table 7). While additional species are likely to have been present, some individuals could not be identified to species level due to the dry conditions and a consequent lack of fertile material.

Table 7: Natural Grasslands TEC indicator species

Scientific name	Common name	Site			
		02	04	06	08
Aristida latifolia	Feather-top wiregrass				
Aristida leptopoda	White speargrass	✓	✓	✓	
Astrebla elymoides	Hoop mitchell grass				
Astrebla lappacea	Curly mitchell grass				
Astrebla squarrosa	Bull mitchell grass				
Bothriochloa erianthoides	Satin-top grass		✓	✓	
Dichanthium queenslandicum	King blue-grass				
Dichanthium sericeum	Queensland bluegrass				
Eriochloa crebra	Cup grass				
Panicum decompositum	Native millet		✓		✓
Panicum queenslandicum	Yabila grass				
Paspalidium globoideum	Shot grass				
Thellungia advena	Coolibah grass				
	TOTAL	1	3	2	1

Squatter pigeon

Incidental searches for the squatter pigeon were conducted opportunistically from over 250 km of driving during the four days of field surveys on the project site, however, no squatter pigeons were recorded.



Further targeted surveys will be undertaken during the post-wet season survey when birds are more likely to be actively foraging for grass seed.

Australian painted snipe

No surveying was undertaken for Australian painted snipe during the dry season survey monitoring. Instead, surveys will be undertaken during the wet season (defined as between 1 November in one year to 31 May in the following year), following a significant inundation event.

3.2 PHOTO MONITORING

Although very dry, photo monitoring on the Project site showed a variety of levels of cover ranging from dense grassy understorey (Site 11: refer to Photo C-105 in Appendix C) through to areas subject to moderate grazing (Site 12: Photo C-110 in Appendix C) resulting in reduced grass cover. The results of the photo monitoring on the offset site are presented in Appendix C.

3.3 WEED MONITORING

A total of 20 weed species were identified from the weed monitoring plots. Results are presented for 19 of the 20 weed monitoring plots as data for Site 05 was lost following completion of fieldwork. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 19 weed monitoring plots, the average number of weed species observed per plot was 3.2 species, ranging between no species (Site 10) and five species (Site 02, 04, 06, 19 and 20), with 11 weed species only encountered at single sites. Weed cover across the 20 weed monitoring plots averaged 4.8%; ranging between 0% (Site 10) and 12.6% (Site 11) (Table 8) (Figure 7: Project site weed monitoring results).

The most commonly encountered weeds were *Verbena officinalis* and *Parthenium hysterophorus*, each recorded from 11 of the 19 sites (Table 8). However, while encountered at a large number of sites, the average cover of *Melinis repens* and *Parthenium hysterophorus* across those encountered sites averaged 1.5% and 1.7% respectively. *Cenchrus ciliaris* was the weed species with the highest average cover, averaging 3.9% cover across the seven sites it was recorded from (Table 8).

Spatially, the site with the highest cover of weeds was not evidently subject to grazing (Site 11). Sites which had been grazed displayed less weed cover (e.g. Site 13, with 3.9% cover), however, this may be due to a considerable reduction in total groundcover – resulting from a combination of overgrazing and drought.



Table 8: Results of weed monitoring assessments at the Project site

Scientific name	Common name	Family name	Percentage cover of weed species from given site #								#	Avg cover												
			01	02	03	04	05°	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	sites	(%) ^a
Cyclospermum leptophyllum	Slender celery	Apiaceae				0.2	-																1	0.2
Gomphocarpus physocarpus	Balloon cottonbush	Apocynaceae					-	0.6			0.1												2	0.4
Cirsium vulgare	Spear thistle	Asteraceae		0.1			-																1	0.1
Erigeron bonariensis	Giant fleabane	Asteraceae					-				0.1												1	0.1
Lactuca serriola	Prickly lettuce	Asteraceae				0.1	-																1	0.1
Parthenium hysterophorus	Parthenium	Asteraceae				1.3	-	1.1	0.2	0.5	4.1				3.2		0.2		0.1	3.8	0.3	4.1	11	1.7
Senecio madagascariensis	Fireweed	Asteraceae		0.1			-																1	0.1
Opuntia stricta	Common prickly pear	Cactaceae					-		0.2														1	0.2
Opuntia tomentosa	Velvet tree pear	Cactaceae					-							2.5									1	2.5
Senna sp		Fabaceae					-															0.1	1	0.1
Stylosanthes viscosa	Sticky stylo	Fabaceae					-							0.1							1.1		2	0.6
Vachellia farnesiana	Mimosa bush	Fabaceae					-			5.0	2.5								6.1	3.0	0.5	0.3	6	2.9
Sida cordifolia	Flannel weed	Malvaceae		0.2	0.1	0.4	-						0.3										4	0.3
Sida spinosa	Sida	Malvaceae					-	0.1															1	0.1
Argemone ochroleuca	Mexican poppy	Papaveraceae					-	0.1															1	0.1
Cenchrus ciliaris	Buffel grass	Poaceae			1.5		-		0.2				12.3				5.2	0.2			7.6	0.2	7	3.9
Megathyrsus maximus	Guinea grass	Poaceae					-		0.5														1	0.5
Sorghum halepense	Johnson grass	Poaceae		3.8			-								0.3		0.1						3	1.4
Stachytarpheta jamaicensis	Snakeweed	Verbenaceae					-	0.1		0.1										0.2		0.1	4	0.1
Verbena officinalis	Common verbena	Verbenaceae	1.4	1.2	0.2	4.9	-							0.1	0.4	7.1	0.2	0.1		0.7	0.3		11	1.5
		# species	1	5	3	5	-	5	4	3	4	0	2	3	3	1	4	2	2	4	5	5		
		Weed cover (%) ^b	1.4	5.4	1.8	6.9	-	2.0	1.1	5.6	6.8	0.0	12.6	2.7	3.9	7.1	5.7	0.3	6.2	7.7	9.8	4.8		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

 $^{\rm b}$ Weed cover represents the sum of the average weed cover percentages of all weed species.

^c Weed cover data lost





3.4 PEST ANIMAL MONITORING

3.4.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from six of the ten rabbit monitoring plots (R02, R04, R06, R07, R08, R09). Across these plots, pellet abundance ranged from isolated pellets and small clumps more than 10 m apart, to scattered pellets and clumps less than 10 m apart. Brown hares (*Lepus europaeus*) and European rabbits (*Oryctolagus cuniculus*) were also visually confirmed (Figure 8: European rabbit (*Oryctolagus cuniculus*) captured at fauna camera station C01 at the MDS site.) at three separate fauna camera stations (Site C09, C04, C01), which were located along the north-east boundary and main south-west access track (Figure 9).



Figure 8: European rabbit (Oryctolagus cuniculus) captured at fauna camera station CO1 at the MDS site.

Table 9 shows the results of the assessment of overall rabbit impact. The results indicate that over half of the sites displayed evidence of rabbit abundance. As these surveys were conducted during the dry season, no seedlings were observed and the seedling abundance score was marked as 0 for each site. The assessment of overall rabbit impact was denoted as 'Monitor closely' or 'Acceptable' for the majority of sites, with sites R02 and R07 denoted as 'Unacceptable' due to higher rabbit abundance. It is important to note that these overall rabbit impact scores are likely to have been exaggerated by the absence of seedlings, resulting from a lack of rainfall rather than high rabbit abundance.



Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact
R01	0	0	0	0.2	Acceptable
R02	2	0	0	0.2	Unacceptable
R03	0	0	0	0.2	Acceptable
R04	1	0	0	0.2	Monitor closely
R05	0	0	0	0.2	Acceptable
R06	1	0	0	0.2	Monitor closely
R07	2	0	0	0.2	Unacceptable
R08	1	0	0	0.2	Monitor closely
R09	1	0	0	0.2	Monitor closely
R10	0	0	0	0.2	Acceptable

Table 9: Assessment of overall rabbit impact at the MDS Project site.





3.4.2 Feral pigs

Across all eight pig monitoring plots, represented by a total of 12 km of transects, there was confirmed evidence for the presence of feral pigs in seven plots (Figure 10). However, there was no visual evidence for feral pigs either through direct observation or captured at the fauna camera stations. Evidence of feral pig presence within plots ranged from 0% (Site PO2) to 57% (Site PO1) and, on average, was observed across 19.6% of the available transect sections within each plot (Table 10: Assessment of overall feral pig presence and activity at the MDS Project site, denoted as either rooting (R), wallows (W), dung (D) or tree rubbing/tusking (T).). Furthermore, opportunistic surveying through ephemeral watercourses, including observation efforts during weed and rabbit monitoring, revealed additional evidence of feral pigs. It is important to note that, due to the very dry conditions, pig scats are likely to have persisted for a number of weeks, thus potentially allowing for an increased abundance of scats compared to during the wet season.

Table 10: Assessment of overall feral pig presence and activity at the MDS Project site, denc	ted as either rooting (R),
wallows (W), dung (D) or tree rubbing/tusking (T).	

	Monitoring plot survey section (50 m)												
Plot	Transect	1	2	3	4	5	6	7	8	9	10	Transect	Plot % (record/30)
P01	1	R	-	R	-	-	R	D W R	D	R	R	70%	57%
	2	R	-	-	R	R	-	-	Т	R	R	60%	
	3	-	-	-	R	-	-	R	R	-	R	40%	
P02	1	-	-	-	-	-	-	-	-	-	-	0%	0%
	2	-	-	-	-	-	-	-	-	-	-	0%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P03	1	D	w	-	-	-	-	-	-	-	-	20%	10%
	2	-	-	-	R	-	-	-	-	-	-	10%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P04	1	-	-	-	-	-	-	-	-	R	-	10%	26.7%
	2	R	R	R	R	-	-	-	-	R	-	50%	
	3	-	D	R	-	-	-	-	-	-	-	20%	
P05	1	-	-	-	-	-	-	-	-	-	-	0%	23%
	2	D R	D	D	-	-	-	-	-	-	-	30%	
	3	R	-	-	-	R	D	-	D	-	-	40%	
P06	1	-	-	R	R	R	-	-	-	R	-	40%	23%
	2	R	-	-	-	R	-	-	R	-	-	30%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
P07	1	-	-	-	-	-	-	D	-	-	-	10%	13.3%
	2	-	-	-	-	R	-	-	-	-	-	10%	
	3	-	-	-	-	-	-	R	R	-	-	20%	
P08	1	-	-	-	-	-	-	-	-	-	-	0%	3%
	2	R	-	-	-	-	-	-	-	-	-	10%	
	3	-	-	-	-	-	-	-	-	-	-	0%	
												Total	19.6%





3.4.3 Fauna camera stations

Of the 15 fauna camera stations, all 15 were considered operable stations across each of the three consecutive nights, resulting in a total of 45 operable station nights for the purposes of calculating Catling Index values for pest animal species. As indicated in Table 11, the fauna cameras confirmed the presence of three pest animal species, namely brown hare (*Lepus capensis*), European rabbit (*Oryctolagus cuniculus*) and feral dog (*Canis familiaris/lupus*). The highest Catling Index score was 4.4, which was calculated for both wild dog and European rabbit. Non-pest animals were also detected from the fauna camera stations, including eastern grey kangaroo (*Macropus giganteus*), cattle (*Bos taurus*) and common brushtail possum (*Trichosurus vulpecula*).

Overall, there were only five individual pest animal detections, recorded from five of the 15 fauna camera stations. The majority of these records originated from cameras located across a central portion of the site (C05, C06, C09, C10), within 1.5 km of the main site office (Figure 11). These areas are located adjacent to existing drainage channel within the vicinity of vegetation patches mapped as 11.8.5, which are likely to be favoured by pest animals given the greater opportunity for both water and shade compared to the surrounding grassland. The remaining detection was recorded from C01, which is also in close proximity to woodland and a watercourse.

In addition, feral goat (*Capra hircus*) scats were observed outside of weed monitoring plot W03. However, there was no evidence for goats either through direct observation or via the fauna cameras.

Pest	Confirmed incidence of pest animal species from given site															
animal species	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	Catling Index
Dog																
Day 1																
Day 2																4.4
Day 3				✓	✓											
Cat	r		r			1			r	1	r			1		
Day 1																
Day 2																0
Day 3																
European rabbit																
Day 1																
Day 2	✓								✓							4.4
Day 3																
Brown h	are		r						r		r			1		
Day 1																
Day 2										✓						2.2
Day 3																
Feral pig																
Day 1																
Day 2																0
Day 3																

Table 11: Pest animal results for the Project site





3.5 GENERAL SITE INSPECTION

The condition of fencing and access gates across the MDS site was good, with no requirement for repair at the time of surveying. Existing access tracks including firebreaks were of a similar standard and are unlikely to require maintenance or upgrades in the near future. Assessment of access tracks and watercourse crossings will be undertaken again post-wet season.

Field investigations revealed that some areas appear to have been subject to overgrazing. In particular, the paddock containing weed monitoring plot W17 displayed a notable lack of groundcover (Figure 12) due to continued grazing during the drought period, with weeds such as *Parthenium hysterophorus* and *Vachellia farnesiana* contributing to a high proportion of the remaining cover. Notwithstanding, it is understood that MDS is responsible for the management of activities within the Project site only and does not have any responsibility for grazing regimes in the mining lease area that is outside of the Project site.



Figure 12: Overgrazing in the vicinity of W17, located within RE 11.8.11



4 RESULTS: LEXINGTON OFFSET SITE

4.1 PHOTO MONITORING

The results of the photo monitoring are present in Appendix C, showing five photos taken ~1.5 m height above ground level looking north, east, south and west with a ground photo taken looking down at an angle of 45° to the north-west of the star picket. This was undertaken at the 20 weed monitoring plots.

Although very dry, photo monitoring showed a variety of levels of cover ranging from a sparse understorey with limited groundcover (Weed plot 02: refer to Photo D-110 in Appendix C) through to areas that have not been grazed and exhibit a dense grassy understory (Site 09: Photo D-145 in Appendix C).

Brigalow Belt pasture photo standards were used for all monitoring points across the project site and the offset site. 'Downs country' photo standards were used for offset areas comprising of RE 11.8.11 and RE 11.8.11a, whilst photo monitoring results from areas of 11.8.4 and 11.85 were assessed against 'Narrow-leaved Ironbark' photo standards (Table 12).

Photo monitoring showed some variability in feed amount levels of ground cover across all photo monitoring sites. Sites in RE 11.8.11 and 11.8.11a ranged in feed amount levels from 1080 kg/ha to 3850 kg/ha. Sites 08, 09, and 10 (representing RE 11.8.11a) had the highest feed amount levels of 3850 kg/ha. Photo monitoring sites in RE 11.8.4 and 11.8.5 ranged in feed amount levels from 310 kg/ha to 1750 kg/ha (Table 12). Although some sites recorded very low feed amounts, these results are likely attributable to lower than average rainfall during the 2019 dry season and are unlikely to have resulted solely from overgrazing.

		Brigalow Belt pasture photo standard type									
Photo monitoring site	RE type	Narrow-leaved ironbark	Downs country	Biomass kg/ha							
01	11.8.11		✓	2140							
02	11.8.4	\checkmark		310							
03	11.8.11		✓	3015							
04	11.8.5	\checkmark		1750							
05	11.8.4	\checkmark		720							
06	11.8.11		\checkmark	2140							
07	11.8.4	\checkmark		1750							
08	11.8.11a		\checkmark	3850							
09	11.8.11a		\checkmark	3850							
10	11.8.11a		\checkmark	3850							
11	11.8.5	\checkmark		1750							
12	11.8.11		✓	3015							
13	11.8.11		\checkmark	3015							
14	11.8.5	\checkmark		1750							
15	11.8.4	\checkmark		1750							
16	11.8.11		✓	1080							
17	11.8.11		✓	2140							

Table 12: Results of photo monitoring assessments on the offset site using Brigalow Belt pasture photo standards.



Brigalow Belt pasture photo standard type												
Photo monitoring site	RE type	Narrow-leaved ironbark	Downs country	Biomass kg/ha								
18	11.8.5	\checkmark		1750								
19	11.8.4	\checkmark		720								
20	11.8.11		\checkmark	3015								



4.2 WEED MONITORING

A total of 22 weed species were identified from the 20 weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 6.1 species, ranging between two species (Site 02, 05) and ten species (Site 03, 15), with seven weed species only encountered at single sites. Weed cover across the 20 weed monitoring plots averaged 22.2%; ranging between 0.60% (Site 05) and 67.4% (Site 04) (Table 13) (Figure 13).

The most commonly encountered weed was *Cenchrus ciliaris*, recorded from 18 of the 20 sites (Table 13). It was also the weed species with the highest average cover, averaging 13.1% cover across the sites it was recorded within. Although only recorded within two weed plots, *Megathyrsus maximus* also displayed a high average cover of 13.1%.

The site with the highest cover of weeds was Site 04, which was dominated by *Cenchrus ciliaris*, despite not currently being subject to grazing. Sites with higher species richness (Site 03, 15) also displayed evidence of historical grazing pressure; it is likely that cattle were significant vectors of weed propagules across the Lexington site. Site 05 displayed the lowest cover and species richness of weeds, yet also exhibited signs of historical grazing pressure. On average, weed plots located in areas of natural grassland (RE 11.8.11) contained a higher species richness of weeds (7.2) compared with woodland sites (5.1).



Table 13: Results of weed monitoring assessments at Lexington.

Scientific name	Common namo	. Family name	Percentage cover of weed species from given site															# citor	• # sites • Avg cover (%)a					
Scientific fiame	Common name	Failing fiame	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	# sites	Avg cover (%)
Bidens bipinnata	Bipinnate beggar's ticks	Asteraceae	0.1		0.1						0.1						0.2	1.1					5	0.3
Lactuca serriola	Prickly lettuce	Asteraceae				0.1																	1	0.1
Parthenium hysterophorus	Parthenium weed	Asteraceae	6.6		4.6	0.2		24.3	0.1	2.1			0.1	1.1	0.9	5.5	4.3	0.7	3.6		0.1	0.5	15	3.6
Verbesina encelioides	Goldweed	Asteraceae	0.2		0.2						4.3	2.9		0.3	0.6				0.1			0.7	8	1.2
Xanthium pungens	Noogoora burr	Asteraceae																	0.1				1	0.1
Opuntia stricta	Prickly pear	Cactaceae							0.1								0.1						2	0.1
Cucumis myriocarpus	Paddy melon	Cucurbitaceae	0.2		0.8			6.6		0.3		0.1		0.1	0.4	0.1	3.1	1.3	1.5			0.2	12	1.2
Crotolaria juncea	Sun hemp	Fabaceae																0.1					1	0.1
Stylosanthes viscosa	Sticky stylo	Fabaceae				0.3	0.2	0.5	1.8			0.1					0.4			0.2	0.6		8	0.5
Vachellia farnesiana	Mimosa bush	Fabaceae	10.1		11.1	3.0		6.0	0.1	5.8	0.1		1.3			0.8	8.2	7.5	10.7	0.2		0.1	14	4.6
Sida spinosa	Sida	Malvaceae	0.2		0.5						0.2												3	0.3
Waltheria indica	Sleepy morning	Malvaceae															0.6	0.1					2	0.4
Cenchrus ciliaris	Buffel grass	Poaceae	21.3	7.0	0.6	62.6	0.4		7.6	50.6	8.2	12.5	18.0	8.7	0.1		4.1	18.6	2.6	6.6	5.0	1.3	18	13.1
Megathyrsus maximus	Guinea grass	Poaceae									23.5	2.6											2	13.1
Melinis repens	Red natal grass	Poaceae																			0.1		1	0.1
Sorghum halepense	Johnson grass	Poaceae			0.1			2.6		2.5				0.2		2.0							5	1.5
Capsicum sp.	Chilli	Solanaceae									2.7												1	2.7
Stachytarpheta jamaicensis	Snake weed	Verbenaceae						1.3															1	1.3
Verbena officinalis	Common verbena	Verbenaceae	2.7	0.3	1.2	1.2		2.3		0.6			0.4	0.4	0.5	1.2	0.5		2.9	1.7	1.5		14	1.2
Weed sp. Large seed pod																	0.3						1	0.3
Weed sp.1					0.3											0.2			0.3			0.1	4	0.2
Weed sp.2															0.1	0.2							2	0.2
		# species	8	2	10	6	2	7	5	6	7	5	4	6	6	7	10	7	8	4	5	6		
		Weed cover (%) ^b	41.3	7.3	19.5	67.4	0.6	43.5	9.7	61.9	39.1	18.2	19.7	10.8	2.6	10.0	21.7	29.4	21.8	8.7	7.3	2.9		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.





4.3 PEST ANIMAL MONITORING

4.3.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from all 10 rabbit monitoring plots (R01 – R10) (Figure 15). Across these plots, pellet abundance ranged from isolated pellets and small clumps more than 10 m apart, to abundant pellets, often in large clumps and buck-heaps. Brown hares (*Lepus europaeus*) and European rabbits (*Oryctolagus cuniculus*) (Figure 14) were also visually confirmed by six separate fauna camera stations (Site C03, C09, C10, C12, C13, C15), which were spread evenly across the whole site. Brown hares were found to be more abundant, with eight captures recorded across five cameras on three separate nights, as opposed to only two rabbit sightings on one night.



Figure 14: European rabbit (Oryctolagus cuniculus) captured on a fauna camera at Site C12 at Lexington.

Table 14 shows the results of the assessment of overall rabbit impact. The results indicate that all of the sites displayed evidence of rabbit abundance. As these surveys were conducted during the dry season, no seedlings were observed, and the seedling abundance score was marked as 0 for each site. The assessment of overall rabbit impact was denoted as 'Unacceptable' for most sites, due to high levels of rabbit abundance. It is important to note that these overall rabbit impact scores are likely to have been exaggerated by the absence of seedlings, resulting from a lack of rainfall rather than high rabbit abundance.



			-		
Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact
R01	2	0	0	0.2	Unacceptable
R02	4	0	0	0.2	Unacceptable
R03	2	0	0	0.2	Unacceptable
R04	1	0	0	0.2	Monitor closely
R05	3	0	0	0.2	Unacceptable
R06	3	0	0	0.2	Unacceptable
R07	2	0	0	0.2	Unacceptable
R08	1	0	0	0.2	Monitor closely
R09	3	0	0	0.2	Unacceptable
R10	1	0	0	0.2	Monitor closely

Table 14: Assessment of overall rabbit impact at the Lexington offset site.





4.3.2 Feral pigs

Across the eight pig monitoring plots, there was confirmed evidence for the presence of feral pigs in 4 plots. However, there was no evidence for feral pigs either through direct observation or via the fauna cameras. Evidence of feral pig presence within plots ranged from 0% (Sites P02, P03, P04 and P08) to 23% (Site P01) and, on average, was observed across 6.7% of the available transect sections within each plot (Table 15). Indicators of pig presence were often observed within the direct vicinity of areas mapped as RE 11.8.11a (Figure 16). These areas are represented by *Melaleuca bracteata* woodland along ephemeral watercourse and as such, are likely to be favoured by feral pigs given they afford greater cover compared to the surrounding woodland and grassland habitat. Opportunistic surveying through ephemeral watercourses, including observation efforts during weed and rabbit monitoring, also revealed additional evidence of feral pigs. As aforementioned, due to the very dry conditions, pig scats are likely to have persisted for an extended period, thus potentially allowing for an increased observed abundance of scats compared to during the wet season.

Plot	Transect	1	2	3	4	5	6	7	8	9	10	Transect	Plot % (record/30)	
P01	1	-	-	-	-	-	-	-	-	-	-	0%	23%	
	2	D	-	-	-	-	-	D	R	R	-	40%		
	3	D	D	-	-	R	-	-	-	-	-	30%		
P02	1	-	-	-	-	-	-	-	-	-	-	0%	0%	
	2	-	-	-	-	-	-	-	-	-	-	0%		
	3	-	-	-	-	-	-	-	-	-	-	0%		
P03	1	-	-	-	-	-	-	-	-	-	-	0%	0%	
	2	-	-	-	-	-	-	-	-	-	-	0%		
	3	-	-	-	-	-	-	-	-	-	-	0%		
P04	1	-	-	-	-	-	-	-	-	-	-	0%	0%	
	2	-	-	-	-	-	-	-	-	-	-	0%		
	3	-	-	-	-	-	-	-	-	-	-	0%		
P05	1	-	-	-	-	D	-	-	-	-	-	10%	7%	
	2	-	-	-	-	-	R	-	-	-	-	10%		
	3	-	-	-	-	-	-	-	-	-	-	0%		
P06	1	-	-	-	-	-	-	-	D	-	-	10%	17%	
	2	-	-	-	-	R	D	D	-	-	-	30%		
	3	R	-	-	-	-	-	-	-	-	-	10%		
P07	1	-	-	-	-	-	-	-	-	-	-	0%	6.67%	
	2	-	-	-	-	D	-	D	-	-	-	20%		
	3	-	-	-	-	-	-	-	-	-	-	0%		
P08	1	-	-	-	-	-	-	-	-	-	-	0%	0%	

Table 15: Assessment of overall feral pig presence and activity at the Lexington offset site, denoted as either rooting
(R), wallows (W), dung (D) or tree rubbing/tusking (T).



	Monitoring plot survey section (50 m)														
Plot	Transect	1	2	3	4	5	6	78	9	1() Tr	ansect F	Plot % (record/30)		
	2	-	-	-	-	-	-	-	-	-	-	0%			
	3	-	-	-	-	-	-	-	-	-	-	0%			
												Total	6.67%		





4.3.3 Fauna camera station

Of the 15 fauna camera stations, 14 were considered operable stations across each of the three consecutive nights, resulting in a total of 42 operable station nights for the purposes of calculating Catling Index values for pest animal species. The fauna camera at site C11 did not display any captures due to a camera error and was deemed inoperable. The fauna cameras confirmed the presence of four pest animal species, namely brown hare (*Lepus capensis*), European rabbit (*Oryctolagus cuniculus*), feral cat (*Felis catus*) (Figure 17) and wild dog (*Canis familiaris*) (Figure 18). The highest Catling Index score was 19.0 for the brown hare, followed by feral cat (19) and wild dog (16.7). Non-pest animals were also detected from the fauna camera stations, including eastern grey kangaroo (*Macropus giganteus*), and pretty-faced wallaby (*Macropus parryi*).

Overall, there were 25 individual pest animal detections, recorded from 12 of the 15 fauna camera stations (Table 16). These detections were made throughout the site (Figure 20), with a concentration of records around a central portion of the property (C10, C12, C13) represented largely by non-remnant grassland (Figure 4).

Pest	Conf	irmed	incide	nce of	pest a	nimal s	pecies	from	given	site						
animal species	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11*	C12	C13	C14	C15	Catling Index
Dog																
Day 1	✓												\checkmark			
Day 2												 Image: A start of the start of	✓			16.7
Day 3												~	~	✓		_
Cat						1								1		
Day 1								✓	✓	✓						
Day 2							✓	✓								19.0
Day 3					~	~				✓						_
Europear	n rabbi	t														
Day 1										✓		✓				
Day 2																4.8
Day 3																_
Brown ha	are															<u>.</u>
Day 1			~												✓	
Day 2			~						✓						✓	19.0
Day 3												✓	✓		✓	
Feral pig																
Day 1																
Day 2																0
Day 3																

Table 16: Pest animal results from the Lexington offset site.





Figure 17: Feral cat (*Felis catus*) captured at fauna camera station C09 on the Lexington offset site.



Figure 18: Wild dog (Canis familiaris) captured at fauna camera station C13 on the Lexington offset site.

4.3.4 Significant fauna observations

During a weed survey at W07, located in RE 11.8.4 (Figure 4), a koala (*Phascolarctos cinereus*) was observed in a mature *Eucalyptus crebra*. The koala is listed as Vulnerable under the EPBC Act and NC Act, and this sighting constitutes the only known record of this species on Lexington.

Figure 19: Koala (*Phascolarctos cinereus*) observed in weed plot W07 on Lexington, sheltering in a *Eucalyptus crebra*.

4.4 GENERAL SITE INSPECTION

The condition of fencing and access gates across the Lexington site was relatively poor, with some fences loose or slumping in a number of locations. In particular, the fence adjacent to the main access track leading from the site entry gate is in poor condition. Sojitz Blue has confirmed in February 2020 that fence maintenance works are proposed to commence in the coming months. Track condition was great overall, with only one prominent pothole along the south-east access track adjacent to weed monitoring plot W18. All dams and watercourses were dry and will be assessed again during the post-wet season monitoring period.

During field investigations at pig monitoring plot P08, a well² was encountered (Figure 21). The well was open and there were no protective barriers or cautionary signage to prevent access. Given this poses a significant risk to traversing wildlife and personnel, it is recommended that the well is either appropriately barricaded or sealed.

Figure 21: Open well discovered in pig monitoring plot P08

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APPENDIX A MONITORING SITE LOCATIONS

PROJECT SITE

Table A-1: Dry-season monitoring site locations and purpose on the Project site

								Pest anima	l monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	H01_0m	641462	7304249	\checkmark	Squatter pigeon	\checkmark				
	H01_50m	641462	7304301	\checkmark	Squarrer pigeon	\checkmark				
01	W01_01	641462	7304249	\checkmark		\checkmark	\checkmark			
01	W01_02	641462	7304301				\checkmark			
	W01_03	641462	7304348				✓			
	R01	641462	7304249	✓				\checkmark		
	H02_0m	640199	7303572	✓	Natural Creation to TEC, King blue group, blue group	✓		\checkmark		
	H02_50m	640203	7303621	✓	Natural Grassianus TEC, King blue-grass, bluegrass	✓		\checkmark		
00	W02_01	640199	7303572	×		✓	✓			
02	W02_02	640203	7303621				✓			
	W02_03	640210	7303627				✓			
	R02	640199	7303572	×				\checkmark		
	H03_0m	638418	7303259	✓		✓				
	H03_50m	638425	7303308	×	- Sdnarrei bißeou	✓				
03	W03_01	638418	7303259	\checkmark		✓	×			
	W03_02	638425	7303308				\checkmark			

								Pest anima	I monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W03_03	638430	7303358				✓			
	R03	638418	7303259	✓				✓		
	H04_0m	637945	7300236	✓	Natural Grasslands TEC, King blue-grass, bluegrass	✓				
	H04_50m	637951	7300287	✓	Natural Grassianus TEC, King Dide grass, Didegrass	✓				
04	W04_01	637945	7300236	\checkmark		✓	✓			
04	W04_02	637951	7300287				\checkmark			
	W04_03	637950	7300338				\checkmark			
	R04	637945	7300236	\checkmark				\checkmark		
	H05_0m	638426	7299836	\checkmark		\checkmark				
	H05_50m	638420	7299885	\checkmark	Squattor pigeon	\checkmark				
05	W05_01	638426	7299836	\checkmark		✓	\checkmark			
05	W05_02	638420	7299885				 ✓ 			
	W05_03	638416	7299937				 ✓ 			
	R05	638426	7299836	✓				×		
	H06_0m	637445	7299566	\checkmark	Natural Crassiands TEC, King blue grass, bluegrass	\checkmark				
	H06_50m	637447	7299615	\checkmark	Natural Grassianus TEC, King blue-grass, bluegrass	\checkmark				
00	W06_01	637445	7299566	✓		✓	✓			
00	W06_02	637447	7299615				\checkmark			
	W06_03	637443	7299668							
	R06	637445	7299566	✓				✓		

								Pest anima	l monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	H07_0m	638426	7298876	\checkmark	Brigalow TEC	✓				
	H07_50m	638419	7298926	✓		✓				
07	W07_01	638426	7298876	✓		✓	✓			
07	W07_02	638419	7298926				✓			
	W07_03	638423	7298974				✓			
	R07	638426	7298876	\checkmark				\checkmark		
-	H08_0m	637032	7298735	✓	Natural Grasslands TEC, King blue-grass, bluegrass	✓				
	H08_50m	637034	7298785	\checkmark		\checkmark				
00	W08_01	637032	7298735	\checkmark		\checkmark	\checkmark			
08	W08_02	637034	7298785				\checkmark			
	W08_03	637039	7298835				\checkmark			
	R08	637032	7298735	\checkmark				\checkmark		
	H09_0m	638387	7298599	\checkmark	Australian painted spine	\checkmark				
	H09_50m	638380	7298648	\checkmark		\checkmark				
00	W09_01	638387	7298599	\checkmark		\checkmark	\checkmark			
09	W09_02	638380	7298648				\checkmark			
	W09_03	638372	7298699				✓			
	R09	638387	7298599	×				~		
10	H10_0m	636412	7297523	×	Squatter pigeon	~				
10 H	H10_50m	636415	7297571	✓		\checkmark				

								Pest anima	monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W10_01	636412	7297523	✓		✓	✓			
	W10_02	636415	7297571				✓			
	W10_03	636413	7297617				✓			
	R10	636412	7297523	✓				✓		
	W11_01	642941	7304772	✓		✓	\checkmark			
11	W11_02	642937	7304825				\checkmark			
	W11_03	642938	7304876				\checkmark			
	W12_01	641428	7303597	\checkmark		✓	\checkmark			
12	W12_02	641426	7303646				\checkmark			
	W12_03	641429	7303696				✓			
	W13_01	641896	7303196	✓		✓	×			
13	W13_02	641899	7303247				×			
	W13_03	641900	7303297				✓			
	W14_01	638991	7303038	✓		✓	×			
14	W14_02	638987	7303090				×			
	W14_03	638988	7303140				×			
	W15_01	637797	7302245	✓		\checkmark	×			
15	W15_02	637796	7302296				\checkmark			
	W15_03	637796	7302347				~			
16	W16_01	638556	7300785	✓		✓	✓			


								Pest anima	l monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W16_02	638560	7300832				✓			
	W16_03	638566	7300882				✓			
	W17_01	637029	7300184	✓		✓	✓			
17	W17_02	637028	7300231				✓			
	W17_03	637024	7300282				✓			
	W18_01	637401	7300321	\checkmark		\checkmark	\checkmark			
18	W18_02	637401	7300368				\checkmark			
	W18_03	637398	7300421				\checkmark			
	W19_01	638301	7301720	\checkmark		\checkmark	\checkmark			
19	W19_02	638295	7301771				\checkmark			
	W19_03	638290	7301821				\checkmark			
	W20_01	636740	7298674	\checkmark		\checkmark	\checkmark			
20	W20_02	636746	7298723				\checkmark			
	W20_03	636752	7298771				\checkmark			
	P01_01	636412	7297523						\checkmark	
21	P01_02	636412	7297423						\checkmark	
	P01_03	636412	7297323						\checkmark	
	P02_01	636397	7298627						\checkmark	
22	P02_02	636397	7298527						\checkmark	
	P02_03	636397	7298427						\checkmark	



								Pest anima	l monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	P03_01	637232	7298835						✓	
23	P03_02	637232	7298735						✓	
	P03_03	637232	7298635						✓	
	P04_01	638126	7299076						✓	
24	P04_02	638126	7298976						✓	
	P04_03	638126	7298876						✓	
	P05_01	638126	7299836						✓	
25	P05_02	638126	7299736						\checkmark	
	P05_03	638126	7299637						✓	
	P06_01	638156	7300985						✓	
26	P06_02	638156	7300885						\checkmark	
	P06_03	638156	7300785						\checkmark	
	P07_01	638992	7303366						\checkmark	
27	P07_02	638992	7303266						\checkmark	
	P07_03	638992	7303166						\checkmark	
	P08_01	641150	7303945						\checkmark	
28	P08_02	641150	7303845						✓	
	P08_03	641150	7303745						✓	
29	C01	642072	7303376							~
30	C02	641090	7303799							✓



									Pest animal monitoring				
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera			
31	C03	639787	7303069							\checkmark			
32	C04	638310	7301921							\checkmark			
33	C05	638696	7301071							✓			
34	C06	638688	7300283							✓			
35	C07	638680	7299504							✓			
36	C08	638449	7298889							✓			
37	C09	637509	7300705							✓			
38	C10	637531	7300057							✓			
39	C11	637071	7299149							✓			
40	C12	636869	7298600							✓			
41	C13	636439	7297829							✓			
42	C14	636321	7297317							✓			
43	C15	637054	7297306							✓			

^a Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha rabbit monitoring plot, P = start point (west) of each site's pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha rabbit monitoring plot, P = start point (west) of each site's pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for habitat assessment, weed monitoring and rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.



LEXINGTON OFFSET SITE

Table A-2: Dry season monitoring site locations and purpose on the Lexington offset site

							Pest animal moni	toring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W01_01	604331	7354000	~	\checkmark	\checkmark			
01	W01_02	604331	7353950			✓			
01	W01_03	604331	7353900			✓			
	R01	604331	7353900	✓			✓		
	W02_01	603925	7353100	✓	✓	✓			
02	W02_02	603908	7353053			✓			
	W02_03	603892	7353005			✓			
	R02	603892	7353005	✓			\checkmark		
	W03_01	604380	7352577	✓	×	✓			
02	W03_02	604380	7352527			✓			
03	W03_03	604380	7352477			✓			
	R03	604380	7352477	✓			\checkmark		
	W04_01	603904	7351791	✓	✓	✓			
04	W04_02	603904	7351741			\checkmark			
04	W04_03	603904	7351691			\checkmark			
	R04	603904	7351691	\checkmark			\checkmark		
	W05_01	603360	7351127	\checkmark	\checkmark	\checkmark			
05	W05_02	603345	7351079			\checkmark			
-	W05_03	603330	7351031			\checkmark			



	- -						Pest animal mon	itoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	R05	603426	7351001	✓			✓		
	W06_01	604790	7351295	✓	✓	✓			
06	W06_02	604790	7351245			✓			
	W06_03	604790	7351195			✓			
	W07_01	604649	7350850	\checkmark	\checkmark	\checkmark			
07	W07_02	604649	7350800			\checkmark			
07	W07_03	604649	7350750			\checkmark			
	R06	604649	7350750	✓			✓		
	W08_01	606488	7350461	✓	✓	✓			
00	W08_02	606488	7350411			✓			
08	W08_03	606488	7350361			✓			
	R07	606488	7350361	✓			✓		
	W09_01	607401	7351233	✓	✓	✓			
09	W09_02	607401	7351183			✓			
	W09_03	607401	7351133			✓			
	W10_01	607175	7351671	✓	✓	✓			
10	W10_02	607175	7351621			✓			
10	W10_03	607175	7351571			✓			
	R08	607175	7351571	\checkmark			✓		
	W11_01	609631	7353204	\checkmark	\checkmark	\checkmark			
11	W11_02	609631	7353154			✓			



			·	-			Pest animal moni	toring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W11_03	609631	7353104			✓			
	R09	609631	7353104	✓			✓		
	W12_01	610371	7353217	✓	✓	✓			
12	W12_02	610371	7353167			✓			
	W12_03	610371	7353117			\checkmark			
	W13_01	610237	7352615	\checkmark	\checkmark	\checkmark			
12	W13_02	610237	7352565			✓			
13	W13_03	610237	7352515			✓			
	R10	610237	7352515	\checkmark			✓		
	W14_01	604883	7354051	×	✓	✓			
14	W14_02	604883	7354001			✓			
	W14_03	604883	7353951			\checkmark			
	W15_01	604543	7352984	\checkmark	\checkmark	\checkmark			
15	W15_02	604543	7352934			✓			
	W15_03	604543	7352884			✓			
	W16_01	604604	7352289	\checkmark	\checkmark	\checkmark			
16	W16_02	604604	7352239			✓			
	W16_03	604604	7352189			✓			
	W17_01	604503	7351656	\checkmark	✓	✓			
17	W17_02	604503	7351606			✓			
	W17_03	604503	7351556			✓			



	- -			-		-	Pest animal mon	itoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W18_01	604074	7350714	√	✓	✓			
18	W18_02	604074	7350664			✓			
	W18_03	604074	7350614			✓			
	W19_01	603812	7352530	✓	✓	✓			
19	W19_02	603798	7352482			✓			
	W19_03	603784	7352434			\checkmark			
	W20_01	610453	7352923	\checkmark	~	×			
20	W20_02	610453	7352873			×			
	W20_03	610453	7352823			×			
	P01_01	604442	7353084					✓	
21	P01_02	604442	7352984					✓	
	P01_03	604442	7352884					✓	
	P02_01	603879	7351891					✓	
22	P02_02	603879	7351791					✓	
	P02_03	603879	7351691					✓	
	P03_01	604513	7354397					✓	
23	P03_02	604513	7354297					✓	
	P03_03	604513	7354197					✓	
	P04_01	604624	7350950					✓	
24	P04_02	604624	7350850					✓	
	P04_03	604624	7350750					✓	



		·	·	-	· · ·		Pest animal mon	itoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	P05_01	606463	7350561					✓	
25	P05_02	606463	7350461					✓	
	P05_03	606463	7350361					✓	
	P06_01	607101	7351233					✓	
26	P06_02	607101	7351133					\checkmark	
	P06_03	607101	7351033					\checkmark	
	P07_01	607092	7351771					\checkmark	
27	P07_02	607092	7351671					✓	
	P07_03	607092	7351571					\checkmark	
	P08_01	609840	7353261					\checkmark	
28	P08_02	609840	7353161					\checkmark	
	P08_03	609840	7353061					✓	
29	C01	604003	7354128						✓
30	C02	604006	7353171						✓
31	C03	603871	7352215						✓
32	C04	603885	7351500						✓
33	C05	605051	7354267						✓
34	C06	604978	7353531						✓
35	C07	604885	7352747						✓
36	C08	604776	7352174						✓
37	C09	604705	7351408						\checkmark



					·	-	Pest animal mon	itoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
38	C10	604402	7350811						\checkmark
39	C11	604107	7350032						✓
40	C12	610612	7353100						✓
41	C13	610156	7352282						✓
42	C14	606580	7350889						✓
43	C15	605496	7350889						\checkmark

^a Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha European rabbit monitoring plot, P = start point (west) of each site's feral pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for weed monitoring and European rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.



APPENDIX B PROJECT SITE – YEAR 3 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 3 monitoring period at the Project site (Meteor Downs South). Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition, fauna species habitat index scores and flora species stocking rates were collected as part of detailed field surveys in December 2019. The site context score was calculated based on a desktop assessment following the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), incorporating ground-truthed regional ecosystem mapping within the extent of ML70452.

Table B-1: Site condition raw data for each RE assessment unit

	Site 0 RE 11	1 .8.5		Site 0 RE 11	2 8.11		Site 0 RE 11	3 .8.5		Site 0 RE 11	4 .8.11		Site 05 RE 11.	; 8.5		Site 0 RE 11	6 .8.11		Site 07 RE 11.4	4.3		Site 0 RE 11	8 .8.11		Site 0 RE 11	9 .3.3a		Site 10 RE 11.8	8.5	
Ecological condition indicators	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.5)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.4.3)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.3.3)	Score	Raw data	Benchmark (11.8.5)	Score
Recruitment of woody perennial species	100	100	5	-	-	-	100	100	5	-	-	-	100	100	5	-	-	-	100	100	5	-	-	-	100	100	5	100	100	5
Native plant species richness - trees	3	2	5	-	-	-	4	2	5	-	-	-	1	2	3	-	-	-	9	2	5	-	-	-	2	3	3	2	2	5
Native plant species richness - shrubs	4	3	5	-	-	-	2	3	3	-	-	-	1	3	3	-	-	-	8	10	3	-	-	-	4	5	3	5	3	5
Native plant species richness - grasses	4	6	3	7	5	5	7	6	5	6	5	5	2	6	3	4	5	3	4	4	5	3	5	3	3	12	3	5	6	3
Native plant species richness - forbs	2	16	2.5	3	10	3	2	16	2.5	1	10	2.5	6	16	3	4	10	3	6	13	3	5	10	3	3	15	2.5	6	16	3
Tree canopy height	16.2	15	5	-	-	-	18.8	15	5	-	-	-	13.03	15	2.5	-	-	-	10.43	24	3	-	-		8.93	18	1 5	10.23	15	4
Tree sub canopy height	4.5	5		-	-		6.67	5		-	-		0	5		-	-					-	-	-	0	10	1.5	5.1	5	
Tree canopy cover	4	13	1	-	-	-	11.7	13	5	-	-	-	0	13	0	-	-	-	28.6	70	2	-	-		10.8	28	1	4.6	13	1
Tree sub canopy cover	0	4		-	-		3.1	4		-	-		0	4		-	-					-	-	-	0	5		0	4	
Shrub canopy cover	0.9	3	3	-	-	-	0.2	3	0	-	-	-	0.4	3	3	-	-	-	5.85	48	3	-	-	-	0	4	0	1.1	3	3
Native perennial grass cover	26	60	1	53.6	30	5	30	60	3	46	30	5	2	60	0	2.8	30	0	7.4	6	5	3	30	1	11	45	1	2	60	0
Organic litter	27	25	5	18	49	3	53.2	25	3	24	49	3	80.2	25	3	45.2	49	5	45	75	5	74	49	5	72	30	3	82	25	3
Large eucalypt trees	6	6	10	-	-	-	14	6	15	-	-	-	2	6	5	-	-	-	0	0	5	-	-		0	10	15	12	6	15
Large non-eucalypt trees	0	0		-	-		0	0		-	-		0	0		-	-		2	80		-	-	-	44	0	15	0	0	
Coarse woody debris	170	250	5	-	-	-	603	250	2	-	-	-	102	250	2	-	-	-	640	1752	2	-	-	-	0	285	0	169	250	5
Non-native plant cover	0.5	0	10	5.5	0	5	0.1	0	10	4.75	0	10	1.25	0	10	3.5	0	10	1.45	0	10	4	0	10	3.1	0	10	1.5	0	10
Total			60.5			21			63.5			25.5			42.5			21			56			22			48			62
/10			7.56			7.00			7.94			8.50			5.31			7.00			7.00			7.33			6.00			7.75



Table B-2: Summary of the site condition, site context	and fauna species ha	bitat index scores us	ed to calculate the ha	bitat condition score	for each RE assessme	ent unit				
	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10
	11.8.5	11.8.11	11.8.5	11.8.11	11.8.5	11.8.11	11.4.3	11.8.11	11.3.3a	11.8.5
MNES values	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Brigalow TEC	Natural Grasslands TEC, King blue-grass, Bluegrass	Australian painted snipe	Squatter pigeon
Site condition										
Recruitment of woody perennial species	5	-	5	-	5	-	5	-	5	5
Native plant species richness - trees	5	-	5	-	3	-	5	-	3	5
Native plant species richness - shrubs	5	-	3	-	3	-	3	-	3	5
Native plant species richness - grasses	3	5	5	5	3	3	5	3	3	3
Native plant species richness - forbs	2.5	3	2.5	2.5	3	3	3	3	2.5	3
Tree canopy height	5	-	5	-	2.5	-	3	-	1.5	4
Tree canopy cover	1	-	5	-	0	-	2	-	1	1
Shrub canopy cover	3	-	0	-	3	-	3	-	0	3
Native perennial grass cover	1	5	3	5	0	0	5	1	1	0
Organic litter	5	3	3	3	3	5	5	5	3	3
Large trees	10	-	15	-	5	-	5	-	15	15
Coarse woody debris	5	-	2	-	2	-	2	-	0	5
Non-native plant cover	10	5	10	10	10	10	10	10	10	10
Total of BioCondition attributes	60.5	21	63.5	25.5	42.5	21	56	22	48	62
MAX ecological condition score	80	30	80	30	80	30	80	30	80	80
Score /10	7.56	7.00	7.94	8.50	5.31	7.00	7.00	7.33	6.00	7.75
Site context										
Size of patch (fragmented bioregions)	10	10	10	10	10	10	10	10	10	10
Connectivity (fragmented bioregions)	5	4	5	5	5	5	5	5	5	5
Context (fragmented bioregions)	5	4	5	5	5	4	5	4	5	5
Distance to permanent watering point (intact bioregions)	-	-	-	-	-	-	-	-	-	-
Ecological corridors	0	0	0	0	0	0	0	0	0	0
Total of site context attributes	20	18	20	20	20	19	20	19	20	20
MAX site condition score	26	26	26	26	26	26	26	26	26	26
Score /10	7.69	6.92	7.69	7.69	7.69	7.31	7.69	7.31	7.69	7.69
Fauna species habitat index										
Threats to species	7	-	7	-	7	-	-	-	1	7
Quality and availability of food and foraging habitat	5	-	5	-	5	-	-	-	5	5
Quality and availability of shelter	5	-	5	-	5	-	-	-	5	5
Species mobility capacity	10	-	10	-	10	-	-	-	1	10



	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10
	14 0 F		14 0 F						5AC 05	14 0 F
	11.8.5	11.8.11	11.8.5	11.8.11	11.8.5	11.8.11	11.4.3	11.8.11	11.3.3a	11.8.5
MNES values	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Squatter pigeon	Natural Grasslands TEC, King blue-grass, Bluegrass	Brigalow TEC	Natural Grasslands TEC, King blue-grass, Bluegrass	Australian painted snipe	Squatter pigeon
Role of site location to species overall population in the state	3	-	3	-	3	-	-	-	4	3
Total of fauna species habitat index	30	-	30	-	30	-	-	-	16	30
MAX fauna habitat index score	50	-	50	-	50	-	-	-	50	50
Score /10	6.00	-	6.00	-	6.00	-	-	-	3.20	6.00

Table B-3: Summary of the species stocking rate index for king blue-grass and bluegrass

Species stocking rate /3 ^a	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10
	11.8.5	11.8.11	11.8.5	11.8.11	11.8.5	11.8.11	11.4.3	11.8.11	11.3.3a	11.8.5
King blue-grass	-	0	-	0	-	0	-	0	-	-
Bluegrass	-	0	-	0	-	0	-	0	-	-

^a species stocking rate contributes 20% toward the habitat condition score for the two MNES flora species, with the remaining 80% made up of site condition and site context.

Table B-4: Summary of the MNES habitat condition score for each RE assessment unit

Assessment unit habitat condition score /10	Site 01	Site 02	Site 03	Site 04	Site 05	Site 06	Site 07	Site 08	Site 09	Site 10	FINAL MNES habitat quality score
	11.8.5	11.8.11	11.8.5	11.8.11	11.8.5	11.8.11	11.4.3	11.8.11	11.3.3a	11.8.5	
Brigalow TEC	-	-	-	-	-	-	7.17	-	-	-	7.17
Natural Grasslands TEC	-	6.96	-	8.13	-	7.14	-	7.32	-	-	7.39
King blue-grass	-	5.57	-	6.50	-	5.71	-	5.86	-	-	5.91
Bluegrass	-	5.57	-	6.50	-	5.71	-	5.86	-	-	5.91
Squatter pigeon	7.08	-	7.28	-	5.93	-	-	-	-	7.18	6.87
Australian painted snipe	-	-	-	-	-	-	-	-	5.38	-	5.38



APPENDIX C PROJECT SITE PHOTO MONITORING



SITE 01 – H01_0M



Photo C-1 North

Photo C-2 East



Photo C-3 South

Photo C-4 West





SITE 01 - H01_50M



Photo C-6 North

Photo C-7 East



Photo C-8 South

Photo C-9 West



Photo C-10 Ground



SITE 02 – H02_0 M



Photo C-11 North

Photo C-12 East



Photo C-13 South

Photo C-14 West



Photo C-15 Ground



SITE 02 – H02_50M



Photo C-16 North

Photo C-17 East



Photo C-18 South

Photo C-19 West



Photo C-20 Ground



SITE 03 – H03_0M



Photo C-21 North

Photo C-22 East



Photo C-23 South

Photo C-24 West



Photo C-25 Ground



SITE 03 – H03_50M



Photo C-26 North

Photo C-27 East



Photo C-28 South

Photo C-29 West



Photo C-30 Ground



SITE 04 - H04_0M



Photo C-31 North

Photo C-32 East



Photo C-33 South

Photo C-34 West



Photo C-35 Ground



SITE 04 - H04_50M



Photo C-36 North

Photo C-37 East



Photo C-38 South

Photo C-39 West



Photo C-40 Ground



SITE 05 – H05_0M



Photo C-41 North

Photo C-42 East



Photo C-43 South

Photo C-44 West



Photo C-45 Ground



SITE 05 – H05_50M



Photo C-46 North

Photo C-47 East



Photo C-48 South

Photo C-49 West



Photo C-50 Ground



SITE 06 - H06_0M



Photo C-51 North

Photo C-52 East



Photo C-53 South

Photo C-54 West



Photo C-55 Ground



SITE 06 - H06_50M



Photo C-56 North

Photo C-57 East



Photo C-58 South

Photo C-59 West



Photo C-60 Ground



SITE 07 – H07_0M



```
Photo C-61 North
```

Photo C-62 East



Photo C-63 South

Photo C-64 West



Photo C-65 Ground



SITE 07 – H07_50M



Photo C-66 North

Photo C-67 East



Photo C-68 South

Photo C-69 West



Photo C-70 Ground



SITE 08 - H08_0M



Photo C-71 North

Photo C-72 East



Photo C-73 South

Photo C-74 West



Photo C-75 Ground



SITE 08 - H08_50M



Photo C-76 North

Photo C-77 East



Photo C-78 South

Photo C-79 West



Photo C-80 Ground



SITE 09 – H09_0M



Photo C-81 North

Photo C-82 East



Photo C-83 South

Photo C-84 West



Photo C-85 Ground



SITE 09 - H09_50M



Photo C-86 North

Photo C-87 East



Photo C-88 South

Photo C-89 West



Photo C-90 Ground



SITE 10 - H10_0M



Photo C-91 North

Photo C-92 East



Photo C-93 South

Photo C-94 West



Photo C-95 Ground



SITE 10 - H10_50M



Photo C-96 North

Photo C-97 East



Photo C-98 South

Photo C-99 West



Photo C-100 Ground



SITE 11 – W11



Photo C-101 North

Photo C-102 East



Photo C-103 South

Photo C-104 West



Photo C-105 Ground



SITE 12 – W12



Photo C-106 North

Photo C-107 East



Photo C-108 South

Photo C-109 West



Photo C-110 Ground



SITE 13 – W13



Photo C-111 North

Photo C-112 East



Photo C-113 South

Photo C-114 West



Photo C-115 Ground


SITE 14 – W14



Photo C-116 North

Photo C-117 East



Photo C-118 South

Photo C-119 West



Photo C-120 Ground



SITE 15 – W15



Photo C-121 North

Photo C-122 East



Photo C-123 South

Photo C-124 West



Photo C-125 Ground



SITE 16 – W16



Photo C-126 North

Photo C-127 East



Photo C-128 South

Photo C-129 West



Photo C-130 Ground



SITE 17 – W17



Photo C-131 North

Photo C-132 East



Photo C-133 South

Photo C-134 West



Photo C-135 Ground



SITE 18 – W18



Photo C-136 North

Photo C-137 East



Photo C-138 South

Photo C-139 West



Photo C-140 Ground



SITE 19 – W19



Photo C-141 North

Photo C-142 East



Photo C-143 South

Photo C-144 West



Photo C-145 Ground



SITE 20 – W20



Photo C-146 North

Photo C-147 East



Photo C-148 South

Photo C-149 West



Photo C-150 Ground



APPENDIX D OFFSET SITE PHOTO MONITORING



SITE 01 – W01



Photo D-1 North

Photo D-2 East



Photo D-3 South

Photo D-4 West



Photo D-5 Ground



SITE 02 – W02



Photo D-6 North

Photo D-7 East



Photo D-8 South

Photo D-9 West



Photo D-10 Ground



SITE 03 – W03



Photo D-11 North

Photo D-12 East



Photo D-13 South

Photo D-14 West



Photo D-15 Ground



SITE 04 – W04



Photo D-16 North

Photo D-17 East



Photo D-18 South

Photo D-19 West



Photo D-20 Ground



SITE 05 – W05



Photo D-21 North

Photo D-22 East



Photo D-23 South

Photo D-24 West



Photo D-25 Ground



SITE 06 – W06



Photo D-26 North

Photo D-27 East



Photo D-28 South

Photo D-29 West



Photo D-30 Ground



SITE 07 – W07



Photo D-31 North

Photo D-32 East



Photo D-33 South

Photo D-34 West



Photo D-35 Ground



SITE 08 – W08



```
Photo D-36 North
```

Photo D-37 East



Photo D-38 South

Photo D-39 West



Photo D-40 Ground



SITE 09 – W09



Photo D-41 North

Photo D-42 East



Photo D-43 South

Photo D-44 West



Photo D-45 Ground



SITE 10 – W10



Photo D-46 North

Photo D-47 East



Photo D-48 South

Photo D-49 West



Photo D-50 Ground



SITE 11 – W11



Photo D-51 North

Photo D-52 East



Photo D-53 South

Photo D-54 West



Photo D-55 Ground



SITE 12 – W12



Photo D-56 North

Photo D-57 East



Photo D-58 South

Photo D-59 West



Photo D-60 Ground



SITE 13 – W13



Photo D-61 North

Photo D-62 East



Photo D-63 South

Photo D-64 West



Photo D-65 Ground



SITE 14 – W14



Photo D-66 North

Photo D-67 East



Photo D-68 South

Photo D-69 West



Photo D-70 Ground



SITE 15 – W15



Photo D-71 North

Photo D-72 East



Photo D-73 South

Photo D-74 West



Photo D-75 Ground



SITE 16 – W16



Photo D-76 North

Photo D-77 East



Photo D-78 South

Photo D-79 West



Photo D-80 Ground



SITE 17 – W17



```
Photo D-81 North
```

Photo D-82 East



Photo D-83 South

Photo D-84 West



Photo D-85 Ground



SITE 18 – W18



Photo D-86 North

Photo D-87 East



Photo D-88 South

Photo D-89 West



Photo D-90 Ground



SITE 19 – W19



Photo D-91 North

Photo D-92 East



Photo D-93 South

Photo D-94 West



Photo D-95 Ground



SITE 20 – W20



Photo D-96 North

Photo D-97 East



Photo D-98 South

Photo D-99 West



Photo D-100 Ground



APPENDIX D POST-WET SEASON MONITORING REPORT – YEAR 3 (2019/20) (CO2 AUSTRALIA 2020)



Post-wet Season Monitoring Report – Year 3 (2019/20)

- MDS Project site
- MDS Rail Loop site
- Lexington offset site
- Lexington Rail Loop offset site

Meteor Downs South Coal Mine Project

Sojitz Blue Pty Ltd





Rev	Date	Description
0	17 July 2020	First draft issued to client
1	18 August 2020	Final issued to client

	Name	Position	Date
ORIGINATORS	Dr Jarrad Cousin	Senior Ecologist	17 July 2020
APPROVER	Christopher Ewing	Head of Ecosystem Markets and Innovation	17 July 2020

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1 INTRODUCTION

U&D Mining Industry (Australia) Pty (U&D) has approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to develop and operate the Meteor Downs South (MDS) Coal Mine Project (the MDS Project) (Figure 1). U&D is in a joint venture with Sojitz Blue Pty Ltd (Sojitz Blue) to develop and operate the MDS Project.

Under the Project EPBC Act approval (EPBC 2013/6779), the MDS Project has prepared the following documents:

- Matters of National Environmental Significance Management Plan (MNESMP)
 - to address EPBC 2013/6779 conditions 2, 3 and 4 with respect to the direct and indirect impacts of the MDS Project on matters of national environmental significance (MNES) at the MDS Project site
- Offset Management Plan (OMP)
 - to address EPBC 2013/6779 conditions 5 and 6 with respect to environmental offsets at the Lexington offset site (Figure 1) for significant residual impacts of the MDS Project on MNES and matters of state environmental significance (MSES)

The MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 1. The baseline (Year 1) management periods for the MDS Project site and the Lexington offset site are considered to be June 2017 – June 2018 (Project site) and October 2017 – October 2018 (Lexington offset site).

The current report is the Year 3 (2019/2020) post-wet season monitoring report for both the MDS Project site and the Lexington offset site.

Site	Monitoring activity	Management plan	Frequency	Timing	
	Habitat condition assessment	MNESMP Section 13.3	Annually	Dry season	
	Photo monitoring	MNESMP Section 13.4	Annually		
MDS Project	Targeted surveys for king blue-grass and bluegrass	MNESMP Section 13.5	Annually	End of the wet season and/or when most detectable	
site	Habitat availability assessment for Australian painted snipe	MNESMP Section 13.6	Every 2 years	Wet season or following inundation event	
	Pest animal monitoring	MNESMP Section 13.7	Every 2 years	Dry season and post-wet	
	Weed monitoring	MNESMP Section 13.8	Every 2 years	season	
	General offset site monitoring	OMP Section 7.1	Annual	Post-wet season	
Lexington offset site	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2037	Post-wet season	
	Weed monitoring	OMP Section 7.4	Every 2 years	Dry season and post-wet season	

Table 1: Summary of MDS Project and offset site biodiversity monitoring requirements.



Site	Monitoring activity	Management plan	Frequency	Timing
	Pest animal monitoring	OMP Section 7.5	Every 2 years (dry season and post wet season surveys)	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events

In December 2019, Sojitz Blue received approval under the EPBC Act to develop and operate the Meteor Downs South Mine Rail Loop (MDS Rail Loop). Under the Project EPBC Act approval (EPBC 2019/8482), Sojitz Blue has prepared the following documents:

- Matters of National Environmental Significance Management Plan (Rail Loop MNESMP)
 - to address EPBC 2019/8482 condition 6 with respect to the direct and indirect impacts of the MDS Rail Loop project on matters of national environmental significance (MNES) at the MDS Rail Loop site
- Offset Management Plan (OMP)
 - to address EPBC 2019/8482 conditions 2, 3, 4 and 5 with respect to environmental offsets at the Lexington Rail Loop offset site (Figure 1) for significant residual impacts of the MDS Rail Loop on MNES.

The Rail Loop MNESMP and OMP outline annual biodiversity monitoring requirements at each site, as summarised in Table 2. This report incorporates the Year 1 (2019/2020) post-wet season monitoring report for both the MDS Rail Loop and the corresponding Lexington offset site, including the establishment of monitoring sites at each.

Site	Monitoring activity	Management plan	Frequency	Timing
	General site inspection	Rail Loop MNESMP Section 7.2	Biannually	End of the dry season and end of the wet season
	Habitat quality assessments and photo monitoring	Rail Loop MNESMP Section 7.3	Annually	Post-wet season
MDS Rail Loop site	Targeted surveys for king blue-grass	Rail Loop MNESMP Section 7.4	Annually	
	Weed monitoring	Rail Loop MNESMP Section 7.5	Biannually within habitat quality assessment plots Every 2 years at each of the weed monitoring plots	End of the dry season and post- wet season
	Biomass monitoring for fire management	Rail Loop MNESMP Section 7.6	Biannually	End of the dry season and end of the wet season
	General offset site monitoring	OMP Section 7.1	Annually	Post-wet season

Table 2: Summary of MDS Project Rail Loop and Lexington Rail Loop offset biodiversity monitoring requirements.



Site	Monitoring activity	Management plan	Frequency	Timing
	Habitat condition assessment and photo monitoring	OMP Section 7.2	Every 2 years for first 10 years and then every 5 years thereafter until 31 October 2039	Post-wet season
Lexington Rail Loop offset	King blue-grass surveys	OMP Section 7.3	Every 5 years from baseline (2019)	End of the wet season and/or when most detectable
site	Weed monitoring	OMP Section 7.4	Baseline in 2020 (Year 1), then every 2 years	Dry season and post-wet season
	Biomass monitoring	OMP Section 7.6	Annually	Post wet season prior to and during grazing events




2 METHODOLOGY

Field surveys were undertaken by two tertiary-qualified ecologists (Dr Jarrad Cousin and peter lack) between 16 – 29 June 2020. Permanent monitoring sites were established at each site for the MDS Project and Lexington offset site as part of the baseline surveys carried out between December 2017 and April 2018, detailed in the following:

- MNESMP Baseline Monitoring Report Meteor Downs South Coal Mine Project. A report prepared by CO2 Australia in 2017 (CO2 Australia 2017) – baseline monitoring sites established in December 2017
- Lexington Offset Area Initial Baseline Monitoring Report Meteor Downs South. A report prepared by CO2 Australia in 2018 (CO2 Australia 2018) – baseline monitoring sites established in April 2018.

Permanent monitoring sites for the MDS Rail Loop and the Lexington Rail Loop offset were established as part of Year 1 surveys carried out during the current post-wet season field surveys (June/July 2020), and are detailed herein.

2.1 MONITORING LOCATIONS

2.1.1 MDS Project site

Post-wet season monitoring activities at the MDS Project site comprised:

- General site inspection
- Habitat availability assessment for Australian painted snipe
- Targeted squatter pigeon surveys
- Targeted king blue-grass and bluegrass surveys
- Biomass monitoring
- Photo monitoring
- Weed monitoring
- Pest animal monitoring.

Table 3 shows activities at each monitoring location at the MDS Project site. A total of 43 permanent sites/plots were monitored across the balance of ML70452 outside of the MDS project (refer to Figure 2 and Figure 3). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 3), according to the following:

- 10 x habitat monitoring sites (100 m x 50 m)
 - collocated with weed and rabbit monitoring plots (Sites 01 10)
- 30 x photo monitoring sites
 - established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 10) and at SW corner of weed monitoring plots (Sites 11 – 20)
- 20 x weed monitoring plots (1 ha)
 - partly collocated with weed and rabbit monitoring plots (Sites 01 10), with remaining 10 sites
 (Sites 11 20) standalone weed monitoring plots
- 10 x rabbit monitoring plots (2 ha)
 - collocated with habitat monitoring sites and weed monitoring plots (Sites R01 R10)
- 8 x pig monitoring plots (15 ha) (Sites P01 P08)



- ▶ 15 x pest animal fauna camera stations (Sites C01 C15)
 - Located throughout the site adjacent existing access tracks

At each of the 10 habitat monitoring sites (Sites 01 - 10), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring plots (Sites 11 - 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-1 in Appendix A for detailed locations of each of the monitoring sites at the MDS Project site.

Table 3: Monitoring locations at the MDS Project site, surveyed as part of the 2019/20 post-wet season surveys.

		ipe				Pest anima	al monitorin	g
Site	King blue-grass and bluegrass	Australian painted sn	Biomass monitoring	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Camera trap
01 - 10			✓	\checkmark	✓	✓		
11 – 20			✓	✓	✓			
P01 – P08							√	
T01 – T20								\checkmark
Established transects	✓							
Naroo Dam		\checkmark						



Sojitz Blue Pty Ltd - MDS Project

Figure 2 MDS Project monitoring sites - north	 Mining Lease Disturbance areas Access tracks Watercourse 	 Habitat for Australian painted snipe Habitat monitoring site Habitat monitoring plots Weed monitoring plots 	Pest animal survey tracks Pest animal camera sites	
DATA SOURCE: The folowing datasets are © State of Qld: - Mining Lease The folowing datasets provided by Sojitz - Disturbance areas - Ground-truthed regional ecosystem mapping Data 2140 (2000) - Constitute 2 Statement OD 400 (ADCA Zeo S.C. Designing Transmission Transmission Constitute)	Brigalow TEC Natural Grassland TEC Habitat for King blue-grass and bluegrass Habitat for squatter pigeon	Rabbit monitoring plots Pig monitoring plots 0 0.25 0.5 0.7 Kilometres		Brisbane





2.1.2 MDS Rail Loop site

Post-wet season monitoring activities at the MDS Rail Loop site comprised establishment and monitoring of the following:

- General offset site monitoring
- Habitat quality assessments (including assessment of Natural Grassland thresholds)
- Weed monitoring
- Photo monitoring
- Targeted king blue-grass surveys
- Biomass monitoring

Table 3 shows activities at each monitoring location established at the MDS Rail Loop site. A total of five permanent monitoring sites/plots are monitored (refer to Figure 4). While the Rail Loop MNESMP (SLR 2019a) stipulated one of the weed monitoring plots to be established in the *Leucaena* plantation, consultation with Sojitz Blue indicated the safety issues related to monitoring sites within the centre of the rail loop requiring crossing of the rail line. Instead, all plots were established on the outside of the rail loop (refer to Figure 4). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 4), according to the following:

- 4 x habitat quality assessment sites (50 m x 10 m)
 - collocated with weed monitoring plots, grassland assessment sites and king blue-grass survey sites (Sites MDSRL01 – MDSRL04)
- 4 x Natural Grasslands TEC monitoring sites (50 m x 20 m)
 - collocated with habitat quality assessment sites, assessing Natural Grassland indicators (Sites MDSRL01 – MDSRL04)
- 4 x targeted King blue-grass surveys (50m x 10m)
 - collocated with habitat quality assessment plots and grassland assessment sites (Sites MDSRL01 MDSRL04)
- 9 x photo monitoring sites
 - established at 0 m and 50 m points along 50 m habitat monitoring transect (Sites MDSRL01 MDSRL04) and at SW corner of standalone weed monitoring plot (Site MDSRL05)
- 5 x weed monitoring plots (1 ha)
 - collocated with the habitat monitoring sites (Sites MDSRL01 MDSRL 04), with a single standalone weed monitoring plot (Site MDSRL05)
- 4 x biomass monitoring sites
 - assessed from the 50 m point of the habitat monitoring transect at each of the four habitat monitoring sites (Sites MDSRL01 – MDSRL04),



Site	Habitat quality assessment	Natural Grasslands TEC monitoring	King blue-grass surveys	Photo monitoring	Weed monitoring	Biomass monitoring
MDSRL01 – MDSRL04	\checkmark	\checkmark	\checkmark	\checkmark	✓	\checkmark
MDSRL05				\checkmark	\checkmark	

Table 4: Monitoring locations at the MDS Rail Loop site, surveyed as part of the 2019/20 post-wet season surveys.





2.1.3 Lexington offset site

Post-wet season monitoring activities at the offset site comprised:

- General offset site monitoring
- Photo monitoring
- Weed monitoring
- Biomass monitoring
- Pest animal monitoring

Table 5 shows activities at each monitoring location at the offset site. A total of 43 permanent monitoring sites/plots were monitored across the offset site. Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 3), according to the following:

- 13 x habitat monitoring sites (100 m x 50 m)
 - collocated with weed and rabbit monitoring plots
- 33 x photo monitoring sites
 - 26 established at 0 m and 50 m points along 100 m habitat monitoring transect (Sites 01 13)
 - 7 at SW corner of standalone weed monitoring plots (Sites 14 20)
- 20 x weed monitoring plots (1 ha)
 - 13 sites collocated at all habitat monitoring sites (Sites 01 13),
 - 7 sites (Sites 14 20) standalone weed monitoring plots
- 10 x rabbit monitoring plots (2 ha)
 - collocated with 10 of the habitat monitoring sites (Sites 01-05, 07-08, 10-11 and 13) and weed monitoring plots
- 8 x pig monitoring plots (15 ha) (Sites P01 P08)
- ▶ 15 x pest animal fauna camera stations (Sites C01 C15)
 - fauna camera stations were established along pest animal survey tracks

At each of the 13 habitat monitoring sites (Sites 01 - 13), a 1.8 m capped galvanised star picket is installed at the start (0 m) and central (50 m) points of the 100 m transect. At each of the standalone weed monitoring plots (Sites 14 - 20), a single 1.8 m capped galvanised star picket is installed at the SW corner of the plot. GPS locations are recorded for each of the sites in GDA94, Zone 55 projection.

Refer to Table A-2 in Appendix A for detailed locations of each of the monitoring sites at the Lexington offset site.



Table 5: Monitoring locations at the Lexington offset site, surveyed as part of the 2019/20 post-wet season surveys.

				Pest animal m	onitoring	
Site	Biomass monitoring Photo monitoring		Weed monitoring	Rabbit plot	Feral pig plot	Camera trap
01 – 20	\checkmark	\checkmark	\checkmark			
R01 – R10				\checkmark		
P01 – P08					\checkmark	
T01 – T20						\checkmark





Sojitz Blue Pty Ltd - Lexington offset



0.25

0.5

Kilometres

0.75

Australia

Brisban

DATA SOURCE: The following dataset - Cadastral Data - Mining Lease - Existing offset area

are © State of Qld

Figure 6 Lexington offset monitoring sites - east

Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:15,000@A3



2.1.4 Lexington Rail Loop offset site

Post-wet season monitoring activities at the Lexington Rail Loop offset site comprised establishment and monitoring of the following:

- General offset site monitoring
- Habitat condition assessments
- Weed monitoring
- Photo monitoring
- Biomass monitoring

Table 6 shows activities at each monitoring location established at the Lexington Rail Loop offset site; divided into three 'paddocks' across the north of Lexington – 'North Promenade', 'Harry's' and 'Contours'. A total of 12 permanent monitoring sites/plots are monitored across the three paddocks (refer to Figure 7 and Figure 8). Permanent monitoring sites comprised a mix of nested and non-nested sites (Table 3), according to the following:

- 7 x habitat monitoring sites (50 m x 10 m)
 - collocated with weed monitoring plots (Sites LEXRL01 LEXRL07)
- 19 x photo monitoring sites
 - 14 established at 0 m and 50 m points along habitat monitoring transect (Sites LEXRL01 LEXRL07)
 - 5 at SW corner of standalone weed monitoring plots (Sites LEXRL08 LEXRL12)
- 12 x weed monitoring plots (1 ha)
 - collocated with the seven habitat monitoring sites (Sites LEXRL01 LEXRL07)
 - five additional, standalone weed monitoring plots (Sites LEXRL08 LEXRL12)

Table 6: Monitoring locations at the Lexington Rail Loop offset site, surveyed as part of the 2019/20 post-wet season surveys.

Site	Habitat monitoring	Photo monitoring	Weed monitoring	Biomass monitoring
North Promenade paddoc	k			
LEXRLO1 – LEXRLO2	\checkmark	\checkmark	\checkmark	\checkmark
LEXRL08 – LEXRL09		\checkmark	\checkmark	\checkmark
Harry's paddock				
LEXRLO3 – LEXRLO4	\checkmark	\checkmark	\checkmark	\checkmark
LEXRL10		\checkmark	\checkmark	\checkmark
Contours paddock				
LEXRL05 – LEXRL07	\checkmark	\checkmark	\checkmark	\checkmark
LEXRL11 – LEXRL12		\checkmark	\checkmark	\checkmark



Sojitz Blue Pty Ltd - Lexington Rail Loop offset					Location diagram
Figure 7	Lexington existing fences	Z Lexington offset area	Habitat monitoring sites		M W
Lexington Rall Loop offset	Access tracks	Existing offset area (Category A area)	Habitat monitoring plots		the second
	Lexington Rail Loop offset	\boxtimes Mining leases (ML70376 and ML70145)	Weed monitoring plots		the last is a second second
	C North Promenade paddock	< c			
	Observed vegetation				Brichana
DATA SOURCE: The following datasets are © State of Qld:	E 11.8.11				brisbane
The following datasets provided by Sojitz - Lexington Rail Loop offset areas	E 11.8.5				
Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection	: Transverse Mercator Datum: GDA 1994	Scale: 1:6,000@A3	Metres	Australia	



23°55'5

23°56'S

1 20 Sojitz Blue Pty Ltd - Lexington Rail Loop offse Location diagra Figure 8 --- Lexington existing fences 🖾 Lexington offset area Habitat monitoring sites Lexington Rail Loop offset monitoring sites - east - Access tracks Existing offset area (Category A area) Habitat monitoring plots Lexington Rail Loop offset ☑ Mining leases (ML70376 and ML70145) ↓ Weed monitoring plots Harry's paddock Observed vegetation Contours paddock E 11.8.11 DATA SOURCE: The following datasets are © State of Qld: - Mining leases The following datasets provided by Sojitz - Lexington Rail Loop offset areas Brisbane E 11.8.5 200 400 600 800 Metres Australia Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection: Transverse Mercator Datum: GDA 1994 Scale: 1:17,500@A3



2.2 KING BLUE-GRASS AND BLUEGRASS SURVEYS (MDS PROJECT AND MDS RAIL LOOP SITES)

2.2.1 MDS Project site

Targeted surveys were undertaken for king blue-grass and bluegrass throughout the MDS Project site. This included incidental surveys while traversing the site on foot (e.g. weed monitoring, rabbit monitoring and pig monitoring plots) as well as targeted surveys along established transects previously surveyed in March 2018. While the survey period is later than the typical flowering season for king blue-grass and bluegrass, the two species can be successfully discerned from other grass species (particularly superficially-similar *Dichanthium* and *Bothriochloa* species) when not in flower through the morphology of the leaves and basal spikelet glumes.

Targeted transect surveys were undertaken along 12 of the 25 transects previously surveyed in March 2018, including the only two transects with previously confirmed records of the two species. Threatened grass surveys were undertaken targeting the presence, distribution and abundance of king blue-grass and bluegrass within 2 m of the centreline of the 12 transects.

Where king blue-grass or bluegrass was encountered within 2 m of the centreline of a transect, an estimate was made of the number of tussocks of each species considered to be within a contiguous population. A tussock was defined as a tuft or clump of a given species of grass growing from a common origin, whereas a population was defined as a collection of contiguous tussocks of a given species. The number of tussocks comprising a population was still estimated where populations extended beyond 2 m of the transect centreline. The number of tussocks in a population was estimated by assigning a population size to one of six abundance categories:

- 1 2 tussocks
- ≥2 5 tussocks
- ≥5 20 tussocks
- ≥20 50 tussocks
- ≥50 100 tussocks
- 100+ tussocks

An estimate of population size of a given species was calculated by summing the lower range interval of each population's tussock abundance category to represent the minimum estimate of abundance, with the upper range interval of each population's tussock abundance category summed to give an upper estimate of abundance. The resulting range represents a conservative estimate of tussock abundance across the survey area (i.e. survey area with four populations: 1-2 tussocks, 2-5 tussocks, 20-50 tussocks and 100+ tussocks equates to a survey area abundance range estimate of 123 – 157 tussocks from four populations). Based on the number of populations, a calculation was also made of the number of populations per kilometre of transect, which in combination with the estimate of total population size within the survey area allows for a comparison with monitoring events in subsequent years.



Transact	Sta	rt point	Enc	End point							
Transect	Easting	Northing	Easting	Northing	Length (m)						
02	640990	7303811	640698	7303848	294						
07	637991	7302726	637926	7302590	151						
08	637777	7302305	637857	7302105	215						
10	638634	7300462	638640	7300700	238						
11	637417	7300418	637561	7299986	456						
12	637935	7300289	638196	7300219	270						
13	638328	7300164	638659	7299995	372						
14	637336	7299852	637459	7299556	321						
19	637123	7298983	637002	7298677	329						
20	638076	7298778	638159	7298929	172						
22	636545	7298529	636783	7298451	251						
24	636562	7297408	636656	7297343	114						
25	637273	7297385	637498	7297339	230						
				Total	3,413						

Table 7: Threatened grass survey transect locations (UTM coordinates in GDA94) and lengths for the 12 transects surveyed in June 2020.

2.2.2 MDS Rail Loop site

Targeted surveys for king blue-grass were undertaken within the 50 m x 10 m plot of each of the four habitat quality assessment sites (MDSRL01 – MDSRL02). As noted above, the survey period Is later than the typical flowering season for king blue-grass although the species is able to be successfully discerned from superficially-similar species when not in flower through the morphology of the leaves and basal spikelet glumes. Where king blue-grass was encountered within the plot, an estimate was made of the number of tussocks considered to be within a contiguous population in accordance with method outlined above (Section 2.2.1)

2.3 HABITAT AVAILABILTY ASSESSMENT FOR AUSTRALIAN PAINTED SNIPE (MDS PROJECT SITE)

Monitoring of habitat availability for Australian painted snipe was undertaken during the post-wet season surveys, which included:

- systematic surveying for Australian painted snipe by traversing habitat areas with the aim of detecting by sight or by flushing. Surveys were undertaken on three mornings over a five day period, totalling approximately eight hours
- quantification of the area of Australian painted snipe habitat.

The systematic survey included multiple circumnavigations of fringing habitat surrounding Naroo Dam, with access granted by Glencore via the Rolleston Mine to those parts of Naroo Dam not within the MDS lease.

The extent of Australian painted snipe habitat on the site was identified and quantified in the field in accordance with the following criteria, consistent with the known ecology of the species:

Shallow water foraging habitat – calculated as the area of open water habitat (on the lease and adjacent lease).



- Muddy substrate foraging habitat calculated as 10 m buffer adjacent open water habitat (on the lease and adjacent lease).
- Area of appropriate shelter habitat calculated as areas of rank emergent tussocks of grass, sedges, rushes or reeds, samphire, clumps of lignum (*Muehlenbeckia*), canegrass or Melaleuca within 50 m of the boundary of open water habitat.

2.4 HABITAT CONDITION ASSESSMENT (MDS RAIL LOOP AND LEXINGTON RAIL LOOP OFFSET SITES)

Habitat condition assessment sites were established at the MDS Rail Loop site and Lexington Rail Loop offset sites based on the requirements of the *Guide to determining terrestrial habitat quality* (DEHP 2017). A total of four habitat condition assessment sites were established at the MDS Rail Loop site, with seven habitat condition assessment sites established at the Lexington Rail Loop offset site. Each of the habitat condition assessment sites N – S running 100 m x 50 m transects, with the start (0 m) and central (50 m) points marked with a 1.8 m galvanised steel picket with plastic safety cap (refer to Figure 4 and Figure 7).

Habitat condition assessments for Natural Grasslands TEC and king blue-grass were undertaken at the habitat condition assessment sites generally in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017). Through the application of the guide, a habitat quality score was calculated for each MNES based on the following key indicators:

- site condition: a general condition assessment of vegetation compared to a benchmark
- site context: an analysis of the site in relation to the surrounding environment

In the absence of the *Guide to determining terrestrial habitat quality* (DEHP 2017) including a species habitat index for flora species, the habitat condition scores for the MNES flora species (king blue-grass) included a species presence index out of three, whereby: 0 = absent/not confirmed, 2 = up to five tussocks confirmed, 2.5 = up to 20 tussocks confirmed, 3 = more than 20 tussocks confirmed. The habitat condition score for the king blue-grass was then calculated as a combination of site condition and site context for the RE assessment unit (representing 80% of the score), with species stocking rate converted to a score out of 10 and contributing 20%.

2.5 PHOTO MONITORING (ALL SITES)

Photo monitoring was undertaken at permanent sites established as part of baseline surveys on the MDS Project site, Lexington offset site, MDS Rail Loop site and Lexington Rail Loop site to give a representative indication of cover and species composition (including weeds) for the general area and enable visual assessment of habitat changes over time. Photo monitoring sites were established with a 1.8 m galvanised steel picket with plastic safety cap.

At each of the photo monitoring points, five photos were taken from 1.5 m height above ground level looking north, east, south and west with a ground photo taken looking down at an angle of 45° to the northwest of the star picket. Photo monitoring sites were delineated as follows:

- At the MDS project site, photo monitoring was undertaken at 30 sites, including two at each of the 10 habitat condition assessment sites (0 m and 50 m points: Site 01 10), with single photo monitoring points at the SW corner of the remaining 10 weed monitoring plots (Site 11 20) identified in Table 3 and shown in Figure 2 and Figure 3
- At the MDS Rail Loop site, photo monitoring was undertaken at nine sites, including two at each of the four habitat quality assessment sites (0 m and 50 m points: Site MDSRL01 MDSRL04), with single



photo monitoring point at the SW corner of the remaining one standalone weed monitoring plot (Site MDSRL05) identified in Table 4 and shown in Figure 4

- At the Lexington offset site, photo monitoring was undertaken at 33 sites, including two at each of the 13 habitat condition assessment sites (0 m and 50 m points: Site 01 13), with single photo monitoring points at the SW corner of the remaining seven weed monitoring plots (Site 14 20) identified in Table 5 and shown in Figure 5 and Figure 6
- At the Lexington Rail Loop offset site, photo monitoring was undertaken at 19 sites, including two at each of the seven habitat condition assessment sites (0 m and 50 m points: Site LEXRL01 LEXRL07), with single photo monitoring points at the SW corner of the remaining five weed monitoring plots (Site LEXRL08 LEXRL12) identified in Table 6 and shown in Figure 7 and Figure 8.

A record of the photographs is shown in Appendix D to Appendix G for the MDS Project, Lexington offset, MDS Rail Loop and Lexington Rail Loop offset sites, respectively.

2.6 WEED MONITORING (ALL SITES)

For the purposes of this assessment, weeds were taken as any species of plant not considered by the Queensland Herbarium as being native to Queensland (i.e. not listed as either least concern, special least concern, near threatened, vulnerable, endangered, critically endangered or presumed extinct in the wild under the *Nature Conservation Act 1992* (Qld); NC Act), as well as species of plant not considered locally endemic to the region.

Weed monitoring was undertaken at 20 permanent plots at the MDS Project site, 20 permanent plots at the Lexington offset site, five permanent plots established at the MDS Rail Loop site and 12 permanent plots established at the Lexington Rail Loop offset site. Weed monitoring plots were located to incorporate natural variability such as aspect (e.g. a mix of north-, east-, south- and west-facing monitoring sites) and community type, while also targeting trafficable areas (e.g. entry gates, creek crossings, stock watering points) to monitor potential introduction and/or irruptions of prohibited and restricted weed species. At each weed monitoring plot, 3 x 100 m transects (traversing in an east-west direction) were traversed, keeping them parallel to one another, 50 m apart.

Figure 2 and Figure 3 show the location of the MDS Project site weed monitoring plots, Figure 4 shows the MDS Rail Loop weed monitoring plots, Figure 5 and Figure 6 show the Lexington offset site weed monitoring plots and Figure 7 shows the Lexington Rail Loop offset site weed monitoring plots.

At each of the permanent weed monitoring plots, monitoring of weeds was undertaken in accordance with the following method:

- At 10 m intervals along each of the three transects, a 2 m x 2 m plot frame was used to record the presence, species and cover of weeds
- Weed cover at each 2 m x 2 m survey site was recorded as one of five cover classes: 1 = 0%; 2 = 0-5%; 3 = 6-25%; 4 = 26-50%; 5 = 51-100% (Auld 2009)
- An average cover score for each weed species for each 1 ha site was calculated
- The average cover score was then calculated as the average percentage from the 30 plots surveyed from the three 100 m transects
- ▶ The mean cover score across all weed monitoring sites was then calculated.

For the purposes of the calculation of average percentage cover of weeds, each of the five weed cover classes (0-5) were converted to a quantitative weed cover value based on the average value of the range corresponding to that weed cover class, as outlined below:



- Weed cover class 1 (0%) retained a value of 0%
- Weed cover class 2 (0-5%) was converted to a value of 2.5%
- Weed cover class 3 (6-25%) was converted to a value of 15%
- Weed cover class 4 (26-50%) was converted to a value of 37.5%
- Weed cover class 5 (51-100%) was converted to a value of 75%.

In addition to permanent weed monitoring plots, where relevant, incidental observations were collated as part of general site monitoring, recording details of weeds (including location, species and extent) and areas of significant weed cover.

2.7 PEST ANIMAL MONITORING (MDS PROJECT SITE AND LEXINGTON OFFSET SITE)

For the purposes of this assessment, pest animals are defined as any species of fauna not native to Queensland, nor protected under the NC Act.

Pest animal monitoring was undertaken through a combination of:

- plot based monitoring, searching for direct presence (e.g. visual confirmation) or indirect evidence (e.g. tracks, diggings, scats, rubbings etc)
- infra-red, motion-detector fauna cameras, representing opportunities to visually confirm the presence of pest animals.

2.7.1 Rabbits

An assessment of the presence and impact of rabbits was undertaken generally in accordance with Cooke *et al.* (1990). Rabbit monitoring plots were established at the same location as habitat monitoring sites and weed monitoring plots (refer to Figure 2 and Figure 3 for locations at the MDS project site and Figure 5 and Figure 6 for locations at the Lexington offset site).

Each rabbit monitoring plot consisted of a 2 ha plot which was traversed for 15 to 20 minutes, assessing the following (refer to Cooke *et al.* 1990):

- Rabbit abundance a measure of the presence and number of rabbit warrens and the abundance of any faecal pellets (including 'buck-heaps' or latrines) – measured on a scale of 0 – 5.
- Seedling abundance a measure of the presence and abundance of native vegetation seedlings encountered during the 15-20-minute traverse – measured on a scale of 0 – 5.
- Rabbit damage a measure of seedlings (< 0.5 m height) with evidence of rabbit damage, identified as 45° 'secateurs-like' cuts through smaller stems, defoliation and gnawing of bark measured on a scale of 0 5.</p>

From this assessment, a 'corrected regeneration score' was calculated from the seedling abundance and rabbit damage score in accordance with Table 8. This measure corrects for seedling regeneration as a function of observed rabbit damage and is subsequently used to calculate overall rabbit impact with the rabbit abundance score.



		S	eedling a	bundand	e	
Rabbit damage	0	1	2	3	4	5
0	0.20	1.00	2.00	3.00	4.00	5.00
1	0.20	0.50	1.00	1.50	2.00	2.50
2	0.20	0.34	0.70	1.00	1.30	1.70
3	0.20	0.28	0.50	0.80	1.00	1.30
4	0.20	0.20	0.40	0.60	0.80	1.00
5	0.20	0.20	0.30	0.50	0.70	0.80

 Table 8: Calculation of corrected regeneration score.

As illustrated in Figure 9, overall rabbit impact was assigned as one of three categories – 'acceptable', 'monitor closely' or 'unacceptable', as determined from a combination of the score for rabbit abundance and the corrected regeneration score. Note that it was assumed that any site with a rabbit abundance score of '0' was assumed to be 'acceptable', irrespective of corrected regeneration score. This is to avoid the situation where, with an absence of rabbits, and a corrected regeneration score of ≤ 2 (attributable to no rabbit damage and less than 20 seedlings), a given site may be identified as one to 'monitor closely' only by virtue of the fact that the few seedlings are attributable to the site being a grassland, rather than it reflecting rabbit grazing.





2.7.2 Fauna camera stations

An assessment of pest animal presence and activity was conducted using infra-red cameras. Infra-red fauna cameras were placed approximately 1.3 m above the ground at 15 fauna camera stations at the MDS Project site, and 15 fauna camera stations at the Lexington offset site. Once established, the fauna cameras were left unattended for a minimum of 3 days/nights to be able to intercept any active fauna using trails in the surveyed area.



Cameras were represented by 12 x Browning Dark Ops 940 HD 16 mega-pixel digital cameras (BTC-6HD-940) and three x LTL-6310 Acorn 12 mega-pixel digital cameras (LTL-6310M). Both camera models were supported by 940nm infra-red night vision and motion sensor capabilities to allow for capture of fauna during the day and night.

The camera settings were set to capture a series of images in succession following a motion trigger. If motion continued after this series of images were captured, then the camera would continue to capture images (in sets of four), followed by at least a one-minute pause, after which any new the camera could be triggered again. Secure Digital (SD) memory cards of 32 gigabyte capacity were used in the cameras for storing captured images.

For each pest animal species, a measure of pest animal presence/activity (Catling Index value) was calculated for the site by summing the number of operable fauna camera stations with evidence of the targeted pest animal by the sum of all operable station days/nights (refer to Mitchell and Balogh 2007a).

Refer to Figure 2 and Figure 3 for locations at the MDS Project site and Figure 5 and Figure 6 for locations at the Lexington offset site.

2.7.3 Feral pigs

An assessment of the presence of feral pig signs (as a measure of feral pig presence or activity) was undertaken generally in accordance with (Mitchell & Balogh 2007b) and (Hone 1988).

Randomly stratified, 500 m x 300 m (15 ha) plots were established in environments that are more regularly impacted included plots within and traversing ephemeral watercourses. A total of eight pig monitoring plots were established at the project site (Figure 2 and Figure 3) including plots within the immediate vicinity of Naroo Dam in the east of the site. Eight pig monitoring plots were also established at the offset site (Figure 4 and Figure 5), one of which was relocated (P03) following a recommendation in the 2018/19 monitoring report (NRC 2019).

Each 15-ha plot comprised 3 x 500 m transects spaced 100 m apart. At each plot, the following method was used for each of the transects:

- traversing in an east-west direction, surveying for the presence of any feral pig signs (rooting, wallows, dung, footprints, travel pads, plant damage and tree rubs, as well as the physical presence of feral pigs) 1 m either side of the transect in 50 m sections
- calculating an abundance score for each transect as the percentage of 'present' feral pig signs from the 10 sections along the 500 m transect
- calculating the mean abundance score (and variance) across all transects.

2.8 BIOMASS MONITORING FOR FIRE MANAGEMENT (ALL SITES)

Biomass monitoring for fire management is undertaken annually to determine the risk of fire and to inform fire management strategies. Biomass is at its greatest at the end of the wet season (around April) with fire risk greatest towards the end of the dry season (September/October). Biomass is monitored using appropriate photo standards¹ to determine dry matter yields and subsequently fuel loads. Biomass monitoring is undertaken at permanent weed monitoring sites at the MDS Project site, MDS Rail Loop site, Lexington offset site and Lexington Rail Loop offset site.

¹ See https://futurebeef.com.au/knowledge-centre/pastures-forage-crops/pasture-photo-standards/



2.9 GENERAL SITE INSPECTIONS (ALL SITES)

General site inspections across all project and offset sites was undertaken, to assess:

- Observations of fencing condition, including any repair/upgrades
- > Access track conditions, including location of watercourse crossings, grids, erosion, etc
- Fire management, including assessment of existing firebreaks, access tracks and roads, fuel loads, and any recent burning activities
- Livestock management including assessment of signs of land degradation and over-grazing
- Erosion management, including assessment of the incidence of erosion, especially around permanent and semi-permanent water bodies or areas subject to inundation or waterlogging
- Incidental fauna observations, including presence, traces and/or abundance of pest animals
- Signs of dust deposition on vegetation located adjacent to the MDS Project and MDS Rail Loop footprints
- Locations of known king blue-grass and bluegrass specimens throughout all sites
- Any additional risks to fauna (i.e. evidence of vehicle strike)



3 RESULTS: MDS PROJECT SITE

3.1 HABITAT MONITORING

Habitat condition assessments were undertaken in December as part of the dry-season surveys and were previously reported. Post-wet season, targeted surveys were undertaken for king blue-grass, bluegrass, squatter pigeon and Australian painted snipe; the results for which are described below.

3.1.1 King blue-grass and bluegrass

Targeted surveys confirmed the presence of king blue-grass and bluegrass at transects and incidentally throughout the MDS Project site. Records of king blue-grass were confirmed from four (33%) of the 12 threatened grass survey transects (transect 12, 19, 22 and 25)(Table 9 and Figure 10 to Figure 12), with two incidentally recorded populations in the vicinity of transect 19 and 22 (Figure 10). Eight populations of king blue-grass were recorded along transect 25, where two populations were confirmed in 2018. A further five populations were confirmed from the three other transects, reflecting a total population size of 95-275 tussocks across the 13 populations in four transects. The two king blue-grass population observed outside of the targeted survey transects totalled 52 – 105 tussocks.

Transect number	King	blue-gr	ass po	pulatio	n size r	ange				Population per transect	
12	5-20									5-20	
19	20-50)	20-50								
22	5-20			5-20				20		15-60	
25	2-5	2-5	2-5	2-5	2-5	5-20		20-50	20-50	55-145	
Total survey area population (range)	95-275										
Number of populations (#/km)	13 (3	.8/km)									

Table 5. King blue-glass populations and their estimated size norm transects at the MDS Project site.

Records of bluegrass were confirmed from one (8%) of the 12 threatened grass survey transects (transect 07), with six incidentally recorded populations (Table 10, Figure 10 and Figure 11).

Four populations of bluegrass were recorded along transect 7, where two populations were confirmed in 2018. The four populations along transect 7 comprised a total population size of 150 – 220 tussocks. The six bluegrass populations observed outside of the targeted survey transects totalled 59 – 140 tussocks.

Previous surveys in 2018 confirmed the presence of a previously undescribed species of *Dichanthium* with the interim name *Dichanthium sp. affine. serecium*. Given the subtleties in difference between the undescribed species and *Dichanthium setosum*, mostly relating to morphological differences in flower morphology, the observed populations could not easily be delineated so were instead assumed to be *Dichanthium setosum*. Investigations into the morphological attributes of the two species is currently underway by the Queensland Herbarium. Once formally described, delineation of the two species will be more readily possible during the flowering season.



Transect number	Bluegras	s populati	on size rar	Population per transect	
7	15-20	100+	20-50	20-50	150-220
Total survey area population (range)	150-220				
Number of populations (#/km)	4 (1.2/kn	n)			

Table 10: Bluegrass populations and their estimated size from transects at the MDS Project site.



148°21'

148°22

148°25'E









3.1.2 Squatter pigeon

Incidental searches for the squatter pigeon were conducted opportunistically from over 200 km of driving during the five days of field surveys on the project site, however, no squatter pigeons were recorded.

3.1.3 Australian painted snipe

Surveying was undertaken around Naroo Dam for Australian painted snipe across three mornings (19, 22 and 23 June 2020), for up to three hours each morning from sunrise (~6.30am). Access was granted to Naroo Dam via the Glencore Rolleston Mine, which allowed for the complete circumnavigation of the dam and its fringing habitat. Surveys involved a combination of binocular scanning of fringing mudflats and shallow water habitat, as well as traversing surrounding fringing vegetation, including *Melaleuca* thickets and rank grasses (e.g. *Megathyrsus maximus*). While surveying for Australian painted snipe was outside of the wet season (defined as between 1 November in one year to 31 May in the following year), and not following any significant inundation event, there was still an appreciable amount of water within the dam and the low-lying channels feeding into it to support habitat for Australian painted snipe (Figure 13 and Figure 14).

While a total of 43 species of birds were encountered utilising or occupying the dam and immediate surrounds, no Australian painted snipe were confirmed during the targeted surveying.

At the time of surveying, Naroo Dam supported a moderate number of shallow-water and open-water dependent waterbird species including small numbers of brolga (*Grus rubicunda*), black swan (*Cygnus atratus*), hardhead (*Aythya australis*), pacific black duck (*Anas superciliosa*), grey teal (*Anas gracilis*) and Australasian grebe (*Tachybaptus novaehollandiae*). Fringing vegetation was sparse, although where present, supported species such as plum-headed finch (*Neochmia modesta*), double-barred finch (*Taeniopygia bichenovii*), zebra finch (*Taeniopygia guttata*), chestnut-breasted mannikin (*Lonchura castaneothorax*) and Australian reed-warbler (*Acrocephalus australis*), with fringing grasslands supporting numerous family groups of brown quail (*Coturnix ypsilophora*). Notably, four species of raptor were hunting around the dam at the time of surveying, including white-bellied sea-eagle (*Haliaeetus leucogaster*), whistling kite (*Haliastur sphenurus*), black kite (*Milvus migrans*) and brown falcon (*Falco berigora*).

In addition to birds, a number of pig wallows were found along the shoreline of Naroo Dam, with a family of three pigs flushed from vegetation fringing the base of the dam wall during surveying.



Figure 13: Naroo Dam looking west from the dam wall showing open water areas grading to shallow fringing habitat.



Use Pty Ltd - MDS Project

Sojitz Blue Pty Ltd - MDS Project



Location diagram



3.2 PHOTO MONITORING

Photo monitoring of the MDS Project site showed a variety of levels of cover ranging from dense grassy understorey (Site 06: refer to Photo D-56 in Appendix D) through to relatively open areas with evidence of grazing (Site 13: Photo D-112 in Appendix D) resulting in reduced grass cover. The results of the photo monitoring in the MDS Project site is presented in Appendix D.

3.3 WEED MONITORING

A total of 24 weed species were identified from the weed monitoring plots. No additional species of weeds were observed on the MDS Project site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 5.2 species, ranging between one species (Site 14) and 13 species (Site 09). Weed cover across the 20 weed monitoring plots averaged 13.3%; ranging between 1.1% (Site 03) and 57.6% (Site 17)(Table 11 and Figure 15).

The most commonly encountered weed was *Parthenium hysterophorus*, recorded from 14 of the 20 sites, followed by buffel grass (*Cenchrus ciliaris*) at 11 of the 20 sites (Table 11), with eight of the 24 weed species only encountered at single sites. While encountered at a large number of sites, the average cover of *Parthenium hysterophorus* and *Cenchrus ciliaris* across those encountered sites averaged 5.3% and 4.5%, respectively. For those weeds found from at least two sites, Angleton grass (*Dichanthium aristatum*) was the weed species with the highest average cover, averaging 10.9% cover across the three sites it was recorded from (Table 11). Although only encountered from a single site, Lippia (*Phyla canescens*) was the weed with the highest cover at any single site, represented by 42.8% cover at Site 09; located immediately adjacent Naroo Dam.



Table 11: Results of weed monitoring assessments at the MDS Project site.

Colontific nome		Family name							Ре	rcentag	ge covei	of wee	d speci	es from	given s	ite							. # citoc	
Scientific name		Family name	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	# sites	Avg cover (%)
Alternanthera pungens	Khaki Weed	Amaranthaceae			0.3				0.3				0.2				0.2						4	0.3
Bidens bipinnata	Bipinnate Beggar's Ticks	Asteraceae			0.4		0.2	0.3	1.1	0.8	1.8	1.2											7	0.8
Lactuca serriola	Prickly Lettuce	Asteraceae						0.4		0.3	0.1							0.2		0.6			5	0.3
Parthenium hysterophorus	Parthenium Weed	Asteraceae				1.0	2.1	0.2	0.3	0.2	3.2	0.1	0.1		20.9		0.5	0.9	35.4	2.1		7.1	14	5.3
Xanthium pungens	Noogoora Burr	Asteraceae									0.4												1	0.4
Xanthium spinosum	Bathurst Burr	Asteraceae													0.2								1	0.2
Crotalaria juncea	Sunhemp	Fabaceae			0.3	0.1	0.4				0.1						0.2	0.1	0.1		0.1		8	0.2
Stylosanthes viscosa	Sticky Stylo	Fabaceae							0.2												0.3		2	0.3
Vachellia farnesiana	Mimosa Bush	Fabaceae	0.1						0.2								0.2		0.2	2.5	0.1		6	0.6
Sida cordifolia	Flannel weed	Malvaceae										0.1	0.1										2	0.1
Sida spinosa	Sida	Malvaceae				0.3	0.3		0.3		0.6			0.1			0.1		0.3	0.5	0.1		9	0.3
Waltheria indica	Sleepy Morning	Malvaceae									0.5				1.3							0.1	3	0.6
Bothrichloa pertusa	Indian Bluegrass	Poaceae											2.5								3.0		2	2.8
Cenchrus ciliaris	Buffel Grass	Poaceae	15.4	9.7			0.1	0.5	2.9		0.2	3.1	2.5	5.8					1.2			8.1	11	4.5
Dichanthium aristatum	Angleton Grass	Poaceae							1.0		19.9								11.9				3	10.9
Megathyrsus maximus	Guinea Grass	Poaceae							0.5														1	0.5
Sorghum halepense	Johnson Grass	Роасеае															0.1		0.1		0.1		3	0.1
Urochloa decumbens	Signal Grass	Poaceae													0.5								1	0.5
Rumex crispus	Curled Dock	Polygonaceae									0.1												1	0.1
Portulaca oleracea	Pigweed	Portulacaceae							0.1														1	0.1
Datura ferox	Fierce Thornapple	Solanaceae																	0.1				1	0.1
Physalis lanceifolia	Goosberry	Solanaceae						1.2			6.5	0.1							8.4			18.2	5	6.9
Phyla canescens	Lippia	Verbenaceae									42.8												1	42.8
Verbena officinalis	Common Verbena	Verbenaceae		0.1	0.1	0.5	0.8			0.1	0.2	0.5		0.1		2.1	0.5	0.1		1.0			12	0.5
		# species	2	2	4	4	6	5	10	4	13	6	5	3	4	1	7	4	9	5	6	4		
		Weed cover (%) ^b	15.5	9.8	1.1	1.9	3.9	2.6	6.9	1.4	76.2	5.1	5.4	6.0	22.9	2.1	1.8	1.3	57.6	6.7	3.7	33.5		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites. ^b Weed cover represents the sum of the average weed cover percentages of all weed species.





3.4 PEST ANIMAL MONITORING

3.4.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from six of the ten rabbit monitoring plots (R02, R05, R07, R08, R09, R10; Figure 17). Across these plots, pellet abundance ranged from isolated pellets and small clumps more than 10 m apart, to scattered pellets and clumps less than 10 m apart. European rabbits (*Oryctolagus cuniculus*) were also visually confirmed (Figure 16) at one fauna camera station (Site C10), while brown hares (*Lepus europaeus*) were considerably more commonly encountered; being confirmed from seven of the 15 fauna camera stations (C03, C04, C05, C08, C11, C12, C13)(Figure 20).



Figure 16: European rabbit (*Oryctolagus cuniculus*) captured at fauna camera station C10 at the MDS Project site.

Table 12 shows the results of the assessment of overall rabbit impact. The results indicate that over half of the sites displayed evidence of rabbit abundance. The assessment of overall rabbit impact was denoted as 'Monitor closely' or 'Acceptable' for the majority of sites, with site R02 denoted as 'Unacceptable' due to higher rabbit abundance.



Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact
R01	0	1	0	1.0	Acceptable
R02	2	0	0	0.2	Unacceptable
R03	0	3	0	3.0	Acceptable
R04	0	0	0	0.0	Acceptable
R05	1	3	0	3.0	Acceptable
R06	0	0	0	0.0	Acceptable
R07	1	3	0	3.0	Acceptable
R08	2	2	0	2.0	Monitor closely
R09	1	1	0	1.0	Monitor closely
R10	2	2	0	2.0	Monitor closely

Table 12: Assessment of overall rabbit impact at the MDS Project site.




3.4.2 Feral pigs

Across all eight pig monitoring plots, represented by a total of 12 km of transects, there was confirmed evidence for the presence of feral pigs in seven plots (Figure 18). However, the only visual evidence for feral pigs through direct observation was from the base of the Naroo Dam wall, with a family of three pigs flushed from low vegetation. Evidence of feral pig presence within plots ranged from 0% (Site P02) to 17% (Site P01 and P08) and, on average, was observed across 10% of the transect sections surveyed within each plot (Table 13). Opportunistic surveying through ephemeral watercourses, including observation efforts during weed and rabbit monitoring, as well as around Naroo Dam revealed additional evidence of feral pigs.

				Mon	itorin	g plot	survey						
Plot	Transect	1	2	3	4	5	6	7	8	9	10	Transect	Plot % (record/30)
	1	-	-	-	-	-	-	-	R	-	R	20%	
P01	2	-	-	-	-	-	-	-	-	-	R	10%	17%
	3	-	R	-	-	-	-	-	R	-	-	20%	
	1	-	-	-	-	-	-	-	-	-	-	0%	
P02	2	-	-	-	-	-	-	-	-	-	-	0%	0%
	3	-	-	-	-	-	-	-	-	-	-	0%	
	1	-	-	-	-	-	-	-	-	-	-	0%	
P03	2	-	-	-	F	F	-	-	-	-	-	20%	7%
	3	-	-	-	-	-	-	-	-	-	-	0%	
	1	-	-	R	-	-	-	-	-	-	-	10%	
P04	2	R	-	-	-	-	-	-	-	-	-	10%	13.33%
	3	-	-	-	-	R	-	-	-	-	R	20%	
	1	-	-	-	-	-	-	-	-	-	-	0%	
P05	2	R F	-	-	-	-	-	Р	-	-	-	20%	7%
	3	-	-	-	-	-	-	-	-	-	-	0%	
	1	-	-	Р	-	-	-	-	-	-	-	10%	
P06	2	-	Ρ	-	-	-	-	-	-	-	-	10%	7%
	3	-	-	-	-	-	-	-	-	-	-	0%	
	1	-	-	-	-	-	-	-	-	-	-	10%	
P07	2	-	-	-	-	-	-	-	-	-	-	10%	13.33%
	3	-	-	-	-	-	-	-	-	-	-	20%	
	1	-	-	-	-	-	-	-	-	ΡF	ΡF	20%	
P08	2	-	-	-	-	-	-	-	ΡF	-	-	10%	17%
	3	-	-	D	-	-	-	ΡF	-	-	-	20%	
												Total	10.0%

Table 13: Assessment of overall feral pig presence and activity at the MDS Project site, denoted as either rooting (R), footprints (F), travel pads (P), or dung (D).



148°24'E

148°22'E



3.4.3 Fauna camera stations

Of the 15 fauna camera stations, all 15 were considered operable stations across at least four consecutive nights, resulting in a total of 68 operable station nights for the purposes of calculating Catling Index values for pest animal species. As indicated in Table 14, the fauna cameras confirmed the presence of three pest animal species, namely brown hare (*Lepus capensis*), European rabbit (*Oryctolagus cuniculus*) and feral dog (*Canis familiaris/lupus*). The highest Catling Index score was 22.1, which was calculated for feral dog, with the lowest Catling Index recorded for European rabbit (2.9). Non-pest animals were also detected from the fauna camera stations, including eastern grey kangaroo (*Macropus giganteus*), rufous bettong (*Aepyprymnus rufescens*), willie wagtail (*Rhipidura leucophrys*), Australian magpie (*Cracticus tibicen*) and crested pigeon (*Ocyphaps lophotes*).

Overall, there were 27 individual pest animal detections, recorded from 13 of the 15 fauna camera stations (Figure 20). Four of the 15 cameras detected two pest animal species, which the remaining nine cameras detecting pest animals detected only a single species.

No additional pest animals (e.g. cats or feral pigs) were confirmed via direct observation or through indirect evidence (e.g. scats).

Pest	Pest Confirmed incidence of pest animal species from given site															
animai species	C01	C02	C03	C04	C05	C0 6	C07	C08	C09	C10	C11	C12	C13	C14	C15	
Nights camera operable*	5	5	5	5	5	5	5	5	4	4	4	4	4	4	4	Catling Index
Dog																
18/06/20					✓											
19/06/20		✓														
20/06/20		✓		✓			✓	\checkmark						✓	✓	22.1
21/06/20								\checkmark			\checkmark			✓	✓	22.1
22/06/20						✓	✓									
23/06/20		✓														
European r	abbit															
18/06/20																
19/06/20																
20/06/20										✓						20
21/06/20										✓						2.5
22/06/20																
23/06/20																
Brown hare	9				T					T			T			
18/06/20												✓				
19/06/20			✓									✓	✓			
20/06/20				✓												14.7
21/06/20											✓	\checkmark	\checkmark			14./
22/06/20					✓			\checkmark								
23/06/20																

Table 14: Pest animal results for the MDS Project site.

* 68 camera nights for the purposes of calculating Catling Index.







Figure 19: Pest animals captured from the fauna camera including wild dog (top, Camera 08) and brown hare (bottom, Camera 12).





3.5 BIOMASS MONITORING

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring sites comprising RE 11.8.11, whilst photo monitoring results from areas of RE 11.8.5 were assessed against 'Eucalypt woodlands', RE 11.4.3 was assessed against 'Blue grass, wire grass' and RE 11.3.3a was assessed against 'Alluvial' photo standards (Table 15). The photo standards used to calculate biomass are different to previous years' assessments, although these photo standards are considered more representative of the actual vegetation communities observed on the MDS Project site. Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 2,500 kg/ha and 3,600 kg/ha 'Eucalypt woodlands' photo standards was reported as 3,050 kg/ha).

Photo monitoring showed some variability in biomass of ground cover across all 10 photo monitoring sites. Sites in RE 11.8.11 supported the greatest biomass (≥3,850 kg/ha, averaging 4,743 kg/ha), with Site 07 (RE 11.4.3) supporting the lowest biomass (2,230 kg/ha) (Table 26). Areas of RE 11.8.5 supported ≥2,500 kg/ha, averaging 2,638 kg/ha, while the one RE 11.3.3a photo monitoring site supported 3,405 kg/ha biomass.

	Brigalow Belt Future Beef pasture photo standard type									
Photo monitoring site*	RE type	Eucalypt woodlands	Blue grass, wire grass	Alluvial	Downs country	Biomass kg/ha				
01	11.8.5	\checkmark				3,050				
02	11.8.11				\checkmark	5,040				
03	11.8.5	\checkmark				2,500				
04	11.8.11				✓	3,850				
05	11.8.5	×				2,500				
06	11.8.11				✓	5,040				
07	11.4.3		✓			2,230				
08	11.8.11				✓	5,040				
09	11.3.3a			✓		3,405				
10	11.8.5	×				2,500				

Table 15: Results of biomass monitoring on the MDS Project site using Brigalow Belt Future Beef pasture pl	hoto
standards.	

* taken from the 0 m point of the permanent habitat monitoring transects.

3.6 GENERAL SITE INSPECTION

The condition of fencing and access gates across the MDS site was good, with no requirement for repair at the time of surveying. Existing access tracks including firebreaks were of a similar standard having recently been re-graded.

Field traverses in the south-west of the MDS Project site noted areas of RE 11.8.11a under stress, with the majority of *Melaleuca bracteata* in these areas showing signs of dieback (Figure 21). However, it was noted that much of this vegetation community was showing evidence of epicormic regrowth. It is therefore likely that this vegetation community is in a state of recovery following the drought prior to the 2019/2020 wet season. Notwithstanding, the condition of these communities will need to continue to be monitored to exclude alternative reasons for the dieback (e.g. whether a consequence of hydrological changes).





Figure 21: Evidence of dieback of *Melaleuca bracteata* in areas of RE 11.8.11a.

Site assessments revealed that areas that were identified as being subject to overgrazing during the dryseason surveys in December 2019 had shown considerable recovery. Notwithstanding, it is acknowledged that MDS is responsible for the management of activities within the MDS Project site only and does not have any responsibility for grazing regimes in the mining lease area that is outside of the MDS Project site.

Site traverses as part of all monitoring activities on the MDS Project site showed no obvious evidence of any dust deposition, nor any impacts attributable to dust deposition on king blue-grass, bluegrass or other vegetation communities. Aside from the dieback of *Melaleuca bracteata* woodland, likely associated with a drought response of this vegetation community (see above), results of targeted king blue-grass and bluegrass surveys would indicate an increase in populations of those species within 500 m of the project footprint since the baseline survey in March 2018.



4 RESULTS: MDS RAIL LOOP SITE

4.1 HABITAT MONITORING

Results of habitat condition assessments identified an average site condition score of 6.71 out of 10 across all four habitat monitoring sites, with scores ranging between 4.83 (Site MDSRL03) and 8.50 (Site MDSRL01 and MDSRL02). Site context scores varied from 8.85 out of 10 (MDSRL02, MDSRL03 and MDSRL04) up to 10 out of 10 (MDSRL01). Appendix B outline details of the site condition assessments, summarised below in Table 16.

Table 16: MDS Rail Loop site habitat monitoring sites: site condition and site context scores calculated in accordance with the *Guide to determining terrestrial habitat quality* (DEHP 2017).

Site	RE	Easting	Northing	Site condition score (/10)	Site context score (/10)
MDSRL01	11.8.11	645575	7303101	8.50	10.00
MDSRL02	11.8.11	646410	7303007	8.50	8.85
MDSRL03	11.8.11	646666	7303114	4.83	8.85
MDSRL04	11.8.11	646834	7303291	5.00	8.85
			Average score	6.71	9.13

MNES habitat condition assessments

Based on the results of the site condition and assessments, habitat condition scores for the two MNES averaged 7.83 out of 10 for Natural grasslands TEC and 6.27 out of 10 for king blue-grass (Table 17). King blue-grass had the lower score of the two MNES (6.13) on account of the absence of any confirmed king-blue grass tussocks within the surveyed plots at the time of surveying. (refer to Appendix B for site condition raw data contributing to site condition score).

Table 17: MDS Ra	il Loop site m	onitoring sites s	howing their habitat	condition scores	contributing to MNES.
	in Loop site in	onitoring sites s	nowing their nuortat	contantion scores	contributing to mitted

Site	RE	Natural Grasslands TEC	King blue- grass
MDSRL01	11.8.11	9.20	7.36
MDSRL 02	11.8.11	8.66	6.93
MDSRL 03	11.8.11	6.70	5.36
MDSRL 04 11.8.11		6.79	5.43
	Average score	7.83	6.27

Natural Grasslands habitat

Natural Grasslands TEC habitat condition scores for the four habitat monitoring sites ranged between 6.70 and 9.20 (Table 17). The four assessment sites supported between four and five TEC indicator grass species (Table 18). While additional species are likely to have been present, some individuals could not be identified to species level due to the dry conditions and as a consequence, lack of fertile material.



Scientific name	Common name	MDSRL01 RE 11.8.11	MDSRL02 RE 11.8.11	MDSRL03 RE 11.8.11	MDSRL04 RE 11.8.11
Aristida latifolia	Feather-top wiregrass	×		✓	×
Aristida leptopoda	White speargrass	×	×	✓	
Astrebla elymoides	Hoop mitchell grass				
Astrebla lappacea	Curly mitchell grass				
Astrebla squarrosa	Bull mitchell grass				
Bothriochloa erianthoides	Satin-top grass	✓	×	✓	×
Dichanthium queenslandicum	King blue-grass				
Dichanthium sericeum	Queensland bluegrass	×	✓	✓	×
Eriochloa crebra	Cup grass				
Panicum decompositum	Native millet	✓	✓	✓	✓
Panicum queenslandicum	Yabila grass				
Paspalidium globoideum	Shot grass				
Thellungia advena	Coolibah grass				
	TOTAL	5	4	5	4

Table 18: Natural Grasslands TEC indicator species at the MDS Rail Loop site.

Natural Grassland quality assessments were conducted at each of the four habitat condition sites within a 50 m x 20 m plot. This included an assessment of the species richness of Natural Grassland TEC indicator species, density of grass tussocks, shrub cover and non-native plant cover. The results of this assessment (Table 19) indicated that two of the condition sites (MDSRL01 and MDSRL02) were in 'best' condition, with the remaining two sites (MDSRL03 and MDSRL04) being only in 'good' condition, largely attributed to the high weed cover in these plots, particularly *Setaria incrassata* and *Physalis lanceifolia*.

TEC quality criteria	MDSRL01 RE 11.8.11	MDSRL02 RE 11.8.11	MDSRL03 RE 11.8.11	MDSRL04 RE 11.8.11
Perennial indicator grass species	5	4	5	4
Number of native grass tussocks	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5	<5	<5	<5
Perennial non-native plant cover (%)	4.5	4.8	13.4	21.6
Condition class	Best	Best	Good	Good

Table 19: Condition classes for the Natural Grasslands TEC

King blue-grass habitat

King blue-grass habitat condition scores for the four habitat monitoring sites ranged between 5.36 and 7.36 (Table 17). No King-blue grass were positively identified from the four habitat condition assessment plots at the time of surveying, accounting for the lower MNES habitat condition score compared with Natural Grassland TEC scores.



4.2 PHOTO MONITORING

Photo monitoring of the MDS Rail Loop site showed a relative consistent levels of biomass, characterised by a moderate grass cover. Whereas many areas of comparable areas of RE 11.8.11 on the MDS project site showed dense grass cover, the MDS Rail Loop site was not consistent with this, despite being represented by the same vegetation community. This is likely a consequence of historical disturbance, with the current condition an indication that the site is in a state of recovery. Ongoing management and concurrent photo monitoring should detect that change over time, as the grassland continues to recover. The results of the photo monitoring in the MDS Rail Loop site is presented in Appendix E.

4.3 WEED MONITORING

A total of 10 weed species were identified from the five weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the five weed monitoring plots, the average number of weed species observed per plot was 5.2 species, ranging between four species (Site MDSRL03 and MDSRL05) and seven species (Site MDSRL01), with four weed species only encountered at single sites. Weed cover across the five weed monitoring plots averaged 15.43%; ranging between 7.7% (Site MDSRL05) and 31.4% (Site MDSRL02)(Table 20 and Figure 22).

The most commonly encountered weeds were *Setaria incrassata* and *Verbena officinalis*, each recorded from all five sites (Table 20). However, while encountered at a large number of sites, the average cover of *Verbena officinalis* across those five encountered sites averaged only 0.3%, whereas *Setaria incrassata* had the highest average cover of 9.0%. *Cenchrus ciliaris* was encountered at three of the five sites, but had the second highest average cover, averaging 5.4% cover across the three sites it was recorded from (Table 20).



		· · · · · · · · · · · · · · · · · · ·							·
Scientific name	Common name	Family name	Pero	centage cover	of weed spec	ies from giver	n site	# sites	$\Delta v g cover (%)^a$
Scientific fiame			MDSRL01	MDSRL02	MDSRL03	MDSRL04	MDSRL05	# SILES	Avg cover (%)
Alternanthera pungens	Khaki weed	Amaranthaceae	0.8			0.8		2	0.8
Parthenium hysterophorus	Parthenium weed	Asteraceae	0.9		0.5	1.3		3	0.9
Opuntia tomentosa	Velvety tree pear	Cactaceae	0.1					1	0.1
Cucumis myriocarpus	Paddy melon	Cucurbitaceae		0.1				1	0.1
Leucaeana leucocephala	Leucaena	Fabaceae		0.6				1	0.6
Cenchrus ciliaris	Buffel grass	Poaceae	0.3	15.6			0.4	3	5.4
Melinis repens	Red natal grass	Poaceae		1.2				1	1.2
Setaria incrassata	Purple pigeon grass	Poaceae	3.9	13.7	16.2	6.4	4.7	5	9.0
Physalis lanceifolia	Gooseberry	Solanaceae	2.4		1.7	2.3	1.7	4	2.0
Verbena officinalis	Common verbena	Verbenaceae	0.1	0.2	0.4	0.1	0.9	5	0.3
		# species	7	6	4	5	4		
		Weed cover (%) ^b	8.5	31.4	18.8	10.9	7.7		

Table 20: Results of weed monitoring assessments at the MDS Rail Loop site.

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.





4.4 **BIOMASS MONITORING**

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all four of the sites comprising RE 11.8.11 (Table 21). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 3,015 kg/ha and 3,850 kg/ha 'Downs country' photo standards was reported as 3,433 kg/ha).

Photo monitoring showed limited variability in biomass of ground cover across all four photo monitoring sites. Overall, there was a moderate biomass for the vegetation type, with a biomass ranging between 2,140 kg/ha and 3,015 kg/ha.

Table 21: Results of biomass monitoring on the MDS Project site using Brigalow Belt F	uture Beef pasture photo
standards.	

		Brigalow Belt Future Beef pasture photo standard type	
Photo monitoring site*	RE type	Downs country	Biomass kg/ha
MDSRL01	11.8.11	\checkmark	3,015
MDSRL02	11.8.11	\checkmark	2,578
MDSRL03	11.8.11	\checkmark	2,140
MDSRL04	11.8.11	\checkmark	3,015

* taken from the 50 m point of the permanent habitat monitoring transect.

4.5 GENERAL SITE INSPECTION

At the time of the monitoring, the rail loop was under construction, with extensive heavy machinery and earthworks. No development was observed outside of the extent of disturbance, and no rubbish or other matters likely to impact on the monitoring area was observed. This included no evidence of dust or other particulate material on the vegetation within the MDS Rail Loop monitoring area.



5 RESULTS: LEXINGTON OFFSET SITE

5.1 PHOTO MONITORING

Photo monitoring of the Lexington offset site showed a variety of levels of cover consistent within the varying vegetation communities. Photo monitoring in natural grassland areas (RE 11.8.11) ranged from a dense understorey in the eastern parts of the offset (Site 20: refer to Photo F-158 in Appendix F) through to relatively open areas with evidence of weeds in the western areas (Site 06: F-55 in Appendix F) resulting in reduced grass cover. Even in upslope areas characterised by shallower skeletal soils over basalt, there was still an appreciable grass cover for the vegetation type (Site 05: refer to Photo F-50 in Appendix F); indicative of a relatively good wet season. The results of the photo monitoring in the Lexington offset site is presented in Appendix F.

5.2 WEED MONITORING

A total of 30 weed species were identified from the 20 weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 20 weed monitoring plots, the average number of weed species observed per plot was 9.3 species, ranging between four species (Site 13) and 15 species (Site 09), with six weed species only encountered at single sites. Weed cover across the 20 weed monitoring plots averaged 31.3%; ranging between 2.7% (Site 13) and 69.3% (Site 09; Table 22; Figure 23).

The most commonly encountered weed was *Cenchrus ciliaris* and *Parthenium hysterophorus*, both recorded from 17 of the 20 sites (Table 22). While recorded from only two weed monitoring plots, *Megathyrsus maximus* had the highest average cover from the two sites of 13.1%.



Table 22: Results of weed monitoring assessments at the Lexington offset site.

	6	Percentage cover of weed species from given site									A													
Scientific name		· Family name	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	# sites	Avg cover (%)*
Alternanthera pungens	Khaki weed	Amaranthaceae														1.0							1	1.0
Cryptostegia grandiflora	Rubber vine	Apocynaceae									1.1												1	1.1
Gomphocarpus physocarpus	Ballon cotton-bush	Apocynaceae									0.1												1	0.1
Bidens bipinnata	Bipinnate beggar's ticks	Asteraceae		0.5	0.2					0.2	13.2	1.8				0.6	2.0	0.5					8	2.4
Lactuca serriola	Prickly lettuce	Asteraceae				0.2										0.3							2	0.3
Parthenium hysterophorus	Parthenium weed	Asteraceae	11.8	0.2	2.0	1.0		11.9	1.8	3.6	0.2	12.3	5.6	3.9	1.6	2.7	11.7	10.7	12.4			7.0	17	5.9
Sonchus oleracea	Sow thistle	Asteraceae			0.2	0.1		0.2			0.1	0.3		0.1	0.2	0.5		0.1	0.7			0.5	11	0.3
Tridax procumbens	Tridax daisy	Asteraceae														0.1							1	0.1
Verbesina encelioides	Goldweed	Asteraceae	0.6			0.5					0.7	0.4				0.1	0.6		0.1				7	0.4
Xanthium pungens	Noogoora burr	Asteraceae									0.1							0.5	0.5				3	0.4
Opuntia tomentosa	Velvety tree pear	Cactaceae								0.1		0.5					0.1						3	0.2
Cucumis myriocarpus	Paddy melon	Cucurbitaceae	0.2		0.1			0.1		0.1			0.1	1.3	0.7	12.6	0.5		0.2			0.1	11	1.5
Clitoria ternatea	Butterfly pea	Fabaceae								11.5	6.5	4.3							0.1				4	5.6
Crotalaria juncea	Sunhemp	Fabaceae	0.2	0.2		0.8	0.1													0.1			5	0.3
Macroptilium atropurpureum	Siratro	Fabaceae									0.1												1	0.1
Stylosanthes viscosa	Sticky stylo	Fabaceae		0.1		1.8	1.7		3.8									0.1		0.5	0.9		7	1.3
Vachellia farnesiana	Mimosa bush	Fabaceae	3.1			0.1		0.3		5.9		0.4	0.5			0.3	3.1	3.8	10.1	0.7			11	2.6
Sida cordifolia	Flannel weed	Malvaceae	0.5	0.4		0.2			2.8		0.8	2.3					0.2	0.1	0.1		0.1		10	0.8
Sida spinosa	Sida	Malvaceae	0.7						0.4				0.1	0.1			0.2		0.7				6	0.4
Waltheria indica	Sleepy morning	Malvaceae								0.5													1	0.5
Bothrichloa pertusa	Indian bluegrass	Poaceae	2.5	2.6		1.0											0.5						4	1.7
Cenchrus ciliaris	Buffel grass	Poaceae	2.0	0.6	1.3	44.9	14.4		26.6	17.9	0.5	21.1	13.3	3.0		0.6	8.7	28.7	6.2	8.1	1.5		17	11.7
Dichanthium aristatum	Angleton grass	Poaceae									4.2	4.4											2	4.3
Megathyrsus maximus	Guinea grass	Poaceae									37.5	18.2											2	27.9
Melinis repens	Red natal grass	Poaceae	2.6	1.2		2.2	2.0	0.1	0.6				0.1	0.1	0.2				0.1	2.7	0.9		12	1.1
Sorghum halepense	Johnson grass	Poaceae			0.3			0.1		1.1	1.5	0.2				0.1		0.1					7	0.5
Rumex crispus	Curled dock	Polygonaceae	0.5		0.1			1.0						2.0								2.1	5	1.1
Capsicum sp.	Chilli	Solanaceae						0.1			2.8												2	1.5
Physalis lanceifolia	Gooseberry	Solanaceae	5.5		16.3	0.2		9.5	0.1	13.4		0.6	0.2			5.3	17.2	13.4	26.9		0.2	0.4	14	7.8
Verbena officinalis	Common verbena	Verbenaceae	2.0	0.2	0.1	1.2								0.2		0.6	0.8	0.1		0.7		0.2	10	0.6
		# species	13	9	9	13	4	9	7	10	15	13	7	8	4	13	12	11	12	6	5	6		
		Weed cover (%) ^b	32.1	6.0	20.6	54.2	18.1	23.3	36.0	54.1	69.3	66.6	19.9	10.6	2.7	24.7	45.5	58.1	58.0	12.8	3.6	10.3		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.





5.3 PEST ANIMAL MONITORING

5.3.1 Rabbits

Results of rabbit monitoring confirmed the presence of rabbit/hare scats from nine of the 10 rabbit monitoring plots (R01 – R09)(Figure 27). Across these plots, pellet abundance ranged from isolated pellets and small clumps more than 10 m apart, to abundant pellets, often in large clumps and buck-heaps. Brown hares (*Lepus europaeus*) and European rabbits (*Oryctolagus cuniculus*) (Figure 24) were also visually confirmed at six separate fauna camera stations (Site C01, C02, C04, C10, C13, C15), which were spread across the whole Lexington offset site (Table 25). Brown hares and European rabbits were found evenly across the Lexington offset site, with five captures of each species recorded from three fauna camera sites; however both species were never captured from the same fauna camera site.



Figure 24: Brown hare (*Lepus europaeus*) captured at fauna camera station C13 on the Lexington offset site.

Table 23 shows the results of the assessment of overall rabbit impact. The results indicate that all of the sites displayed evidence of rabbit abundance with the exception of R10. The assessment of overall rabbit impact was denoted as 'unacceptable' for three sites, due to moderate levels of rabbit abundance (identified through the presence of scats; Figure 25), with rabbit damage only encountered at one site in the form of 45° seedling damage (Figure 26). Remaining sites were either denoted as 'monitor closely', with two sites (R05 and R10) denoted as 'acceptable'.



Site	Rabbit abundance score (0 – 5)	Seedling abundance score (0 – 5)	Rabbit damage score (0 – 5)	Corrected regeneration score (0 – 5)	Overall rabbit impact
R01	1	1	0	1.0	Monitor closely
R02	2	3	0	3.0	Monitor closely
R03	2	2	0	2.0	Unacceptable
R04	2	3	0	3.0	Monitor closely
R05	1	3	0	3.0	Acceptable
R06	2	3	1	1.5	Unacceptable
R07	1	2	0	2.0	Monitor closely
R08	3	3	0	3.0	Monitor closely
R09	3	2	0	2.0	Unacceptable
R10	0	0	0	0.2	Acceptable

Table 23: Assessment of overall rabbit impact at the Lexington offset site.



Figure 25: Rabbit scats and diggings seen at the Lexington offset.



Figure 26: Evidence of rabbit damage in the form of 45-degree angled clipping of young stems, found at the Lexington offset.



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5.3.2 Feral pigs

Across the eight pig monitoring plots, there was confirmed evidence for the presence of feral pigs in five plots. There was evidence of feral pigs through direct observation (P07), observed as a single young piglet, although no pigs were confirmed via and of the 15 fauna cameras. Evidence of feral pig presence within plots ranged from 0% (Sites P03 and P05) to 37% (Site P01) and, on average, was observed across 13.33% of the available transect sections within each plot (Table 24). Indicators of pig presence were often observed within the direct vicinity of areas mapped as RE 11.8.11a (Figure 28). These areas are represented by *Melaleuca bracteata* woodland along ephemeral watercourse and as such, are likely to be favoured by feral pigs given they afford greater cover compared to the surrounding woodland and grassland habitat.

	Monitoring plot survey section (50 m)												
Plot	Transect	1	2	3	4	5	6	7	8	9	10	Transect	Plot % (record/30)
	1	-	R F	-	-	-	-	-	-	R	-	20%	
P01	2	-	Р	-	-	R	-	-	R	Р	P R	50%	37%
	3	-	-	R	R	R	F	-	-	-	-	40%	
	1	-	-	-	-	-	-	-	-	-	-	0%	
P02	2	D	-	-	-	-	-	-	-	-	-	10%	3%
	3	-	-	-	-	-	-	-	-	-	-	0%	
	1	-	-	-	-	-	-	-	-	-	-	0%	_
P03	2	-	-	-	-	-	-	-	-	-	-	0%	0%
	3	-	-	-	-	-	-	-	-	-	-	0%	
	1	-	-	Р	-	R	-	-	-	-	-	20%	_
P04	2	-	-	-	-	-	R	-	-	-	-	10%	13.33%
	3	-	-	-	-	-	-	Р	-	-	-	10%	
	1	-	-	-	-	-	-	-	-	-	-	0%	_
P05	2	-	-	-	-	-	-	-	-	-	-	0%	0%
	3	-	-	-	-	-	-	-	-	-	-	0%	
	1	-	-	-	-	-	-	R	P R	-	PFR	30%	_
P06	2	-	-	-	D R	-	-	-	Р	-	Р	30%	20%
	3	-	-	-	-	-	-	-	-	-	-	0%	
	1	-	-	-	R	-	FR	R	R	-	-	40%	_
P07	2	-	-	-	-	-	-	-	-	-	-	0%	16.67%
	3	-	+ R	-	-	-	-	-	-	-	-	10%	
	1	-	-	-	-	-	-	-	-	-	-	0%	_
P08	2	-	R	Р	R	R	-	-	-	-	-	40%	16.67%
	3	-	-	-	-	FΡ	-	-	-	-	-	10%	
												Total	13.33%

Table 24: Assessment of overall feral pig presence and activity at the Lexington offset site, denoted as either rooting (R), footprints (F), travel pads (P) or physical presence (+).



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5.3.3 Fauna camera station

Of the 15 fauna camera stations, 14 were operable across each of the three consecutive nights, resulting in a total of 42 operable station nights for the purposes of calculating Catling Index values for pest animal species. The fauna camera at site C05 did not display any captures due to a camera error and was deemed inoperable. The fauna cameras confirmed the presence of four pest animal species, namely feral cat (*Felis catus*; Figure 29), brown hare (*Lepus capensis*), European rabbit (*Oryctolagus cuniculus*) and wild dog (*Canis familiaris*; Figure 30). The highest Catling Index score was 21.4 for the feral cat, followed by European rabbit and brown hare (11.9) and wild dog (7.1). Non-pest animals were also detected from the fauna camera stations, including eastern grey kangaroo (*Macropus giganteus*), rufous bettong (*Aepyprymnus rufescens*), Australian magpie (*Cracticus tibicen*), Australian raven (*Corvus coronoides*), galah (*Eolophus roseicapilla*), emu (*Dromaius novaehollandiae*) and horse (*Equus caballus*).

Overall, there were 22 individual pest animal detections, recorded from 9 (64%) of the 14 fauna camera stations (Table 25). These detections were made throughout the site (Figure 31), although there was a notable lack of pest animal detections along Prickle Farm Road that traverses the centre of Lexington (Figure 31).

Pest	Pest Confirmed incidence of pest animal species from given site															
animal species	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	
Nights camera operable*	3	3	3	3	0	3	3	3	3	3	3	3	3	3	3	Catling Index
Wild dog																
25/06/20													\checkmark			
26/06/20																7.1
27/06/20						\checkmark							\checkmark			
Feral cat																
25/06/20			√										√			
26/06/20																21.4
27/06/20	✓	✓	✓			✓				✓	✓		✓			
European r	abbit															
25/06/20										✓						
26/06/20		✓		✓												11.9
27/06/20		✓								✓						
Brown hare	9															
25/06/20																
26/06/20													✓		✓	11.9
27/06/20	✓												✓		✓	

Table 25: Pest animal results from the Lexington offset site.

* 42 camera nights for the purposes of calculating Catling Index.





Figure 29: Feral cat (*Felis catus*) captured at fauna camera station C11 on the Lexington offset site.



Figure 30: Wild dog (*Canis familiaris*) captured at fauna camera station C13 on the Lexington offset site.





5.4 **BIOMASS MONITORING**

5.4.1 Biomass monitoring for fire management

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for offset areas comprising of RE 11.8.11 and RE 11.8.11a, whilst photo monitoring results from areas of RE 11.8.4 and RE 11.8.5 were assessed against 'Narrow-leaved Ironbark' photo standards (Table 26).

Photo monitoring showed some variability in biomass of ground cover. Sites in RE 11.8.11 and 11.8.11a were all at least 2,578 kg/ha and up to 5,040 kg/ha (Site 20), while biomass in RE 11.8.4 and RE 11.8.5 ranged between 1,750 kg/ha in rockier upslope areas (Site 02) and 5,000 kg/ha in more open grassy woodland areas (Site 11; Table 26).

		Brigalow Belt pastu		
Photo monitoring site*	RE type	Narrow-leaved ironbark	Downs country	Biomass kg/ha
01	11.8.11		\checkmark	3,850
02	11.8.4	\checkmark		1,750
03	11.8.11		\checkmark	3,015
04	11.8.5	✓		2,000
05	11.8.4	✓		3,625
06	11.8.11		✓	3,015
07	11.8.4	✓		1,750
08	11.8.11a		✓	3,015
09	11.8.11a		✓	3,850
10	11.8.11a		✓	4,445
11	11.8.5	✓		5,000
12	11.8.11		✓	4,445
13	11.8.11		✓	3,850
14	11.8.5	✓		3,625
15	11.8.4	✓		2,000
16	11.8.11		✓	2,578
17	11.8.11		✓	2,578
18	11.8.5	\checkmark		2,250
19	11.8.4	\checkmark		2,000
20	11.8.11		✓	5,040

 Table 26: Results of biomass monitoring on the Lexington offset site using Brigalow Belt Future Beef pasture photo standards.

* taken from the 0 m point of the permanent habitat monitoring transects (Sites 01 - 12) and the SW corner of the standalone weed monitoring plots (Sites 13 - 20).



5.4.2 Biomass monitoring for sustainable grazing

While cattle were observed within the north-west of the offset area as part of the post-wet season survey, the results of the current biomass monitoring will be utilised as part of the Annual Land Condition-Pasture Budget Assessment, to be completed by Sojitz Blue. This will include an assessment of any proposed grazing management regimes in the offset area.

5.5 SIGNIFICANT SPECIES

While targeted survey for *Dichanthium queenslandicum* (king blue-grass) and *D. setosum* (bluegrass) were not scheduled to be undertaken during the post-west season surveys at the Lexington offset site, numerous populations of both species were confirmed throughout the offset area (Figure 32) during monitoring within weed plots, as well as across rabbit and pig monitoring plots.

Of particular significance was the presence of at least 38 populations of *D. setosum*² which were restricted to areas of RE 11.8.5 and RE 11.8.4 in the west of the offset area. A particularly large population was seen in the vicinity of the weed monitoring plot at site 02, with other populations confirmed from near sites 07 and 19.

Three populations of *Dichanthium queenslandicum* were confirmed from the Lexington offset site, including a large population of over 200 tussocks in the east of the Lexington offset area immediately to the south of site 13 (Figure 32). Another population was confirmed in the east of the offset area to the north-west of site 12, although since surveying in 2018, the eastern-most parts of Lexington have always supported appreciable populations of *D. queenslandicum*. Significantly, a population of *D. queenslandicum* was confirmed in the western expanse of RE 11.8.11 to the north-west of site 14 (Figure 32). While populations of *D. queenslandicum* are known from areas of RE 11.8.11 in North Promenade paddock to the north of the Lexington offset area, it is understood to be the first confirmed record of *D. queenslandicum* in this part of the Lexington offset area.

5.6 GENERAL SITE INSPECTION

Following the dry season monitoring in December 2019, many upgrades and installations of fencing has occurred throughout the Lexington offset site, with additional access tracks also installed. Where observed, updated fencing and access tracks are presented in the Lexington monitoring site figures (Figure 5 and Figure 6). Some of the fencing was being constructed at the time of surveying in June 2020. The additional fencing extent and access tracks outside of the extent of traversed areas in June 2020 could not be confirmed and will need to be supplied.

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. However, cattle were observed in the natural grassland areas in the west of the Lexington offset area during the postwest season monitoring. There was also evidence of previous cattle grazing in some of these offset areas.

Outside of the weed monitoring plots assessed as part of the post-wet season surveys, there were a number of areas away from surveyed plots where weed infestation was considered serious. Most noticeably was the

² Prior surveying by CO2 Australia ecologists in March 2018 confirmed the presence of a previously undescribed species of *Dichanthium* from the Lexington offset area. This species was given the interim name *Dichanthium sp. affine. sericeum* until such time as it is formally described. Since this initial 2018 survey, CO2 Australia ecologist Dr Jarrad Cousin has confirmed additional populations of this undescribed species from other properties in the greater Springsure - Rolleston area. While investigations into this undescribed species are continuing by botanists from the Queensland Herbarium, with assistance from CO2 Australia, discerning the two species in the field is difficult, especially when there is limited flowering material. Consequently, it is highly likely that many of the populations identified as *D. setosum* could in fact be the morphologically similar undescribed *Dichanthium* species. For the purposes of reporting however, and until such time as the species is formally described, any setosum-like species of *Dichanthium* is considered *D. setosum*.



the extent and density of weeds within and adjacent the ephemeral drainage line and bore on Prickle Farm Road that flanks the western edge of the mining lease (ML 70376). In this area, the ephemeral drainage line was densely infested by Noogoora burr (*Xanthium occidentale*), with areas away from the drainage line characterised by dense, monospecific stands of *Parthenium hysterophorus*.





6 RESULTS: LEXINGTON RAIL LOOP OFFSET SITE

6.1 HABITAT MONITORING

Results of habitat condition assessments identified an average site condition score of 7.57 out of 10 across all seven habitat monitoring sites, with scores ranging between 5.67 (Site LEXRL03) and 8.67 (Site LEXRL05). Site context scores varied from 6.54 out of 10 (LEXRL03) up to 10 out of 10 (LEXRL01 and LEXRL02). Appendix C outlines details of the site condition assessments, summarised below in Table 16.

Table 27: Lexington Rail Loop offset site habitat monitoring sites: site condition and site context scores calculated in
accordance with the Guide to determining terrestrial habitat quality (DEHP 2017).

Offset paddock	Site	RE	Easting	Northing	Site condition score (/10)	Site context score (/10)
North	LEXRL01	11.8.11	604390	7355247	6.33	10.00
Promenade	LEXRL02	11.8.11	604758	7354797	8.00	10.00
Hornya	LEXRL03	11.8.11	608595	7355228	5.67	6.54
Harry S	LEXRL04	11.8.11	609262	7355036	8.00	7.31
	LEXRL05	11.8.11	612011	7354575	8.67	7.31
Contours	LEXRL06	11.8.11	611834	7354280	7.83	7.31
	LEXRL07	11.8.11	611215	7353711	8.50	7.31
	·		·	Average score	7.57	7.97

MNES habitat condition assessments

Based on the results of the site condition and assessments, habitat condition scores for the two MNES averaged 7.76 out of 10 for Natural grasslands TEC and 6.92 out of 10 for king blue-grass (Table 17). King blue-grass had the lower score of the two MNES (6.92) on account of the absence of confirmed king-blue grass tussocks from four of the seven surveyed plots. (refer to Appendix C for site condition raw data contributing to site condition score).

Table 28: Lexington Rail Loop offset site monitoring sites showing their habitat condition scores contributing	to
MNES.	

Offset paddock	Site	RE	Natural Grasslands TEC	King blue- grass
North	LEXRL01	11.8.11	8.04	6.43
Promenade	LEXRL02	11.8.11	8.93	7.14
	LEXRL03	11.8.11	6.07	6.52
Harry's	LEXRL04	11.8.11	7.68	8.14
	LEXRL05	11.8.11	8.04	7.76
Contours	LEXRL06	11.8.11	7.59	6.07
	LEXRL07	11.8.11	7.95	6.36
		Average score	7.76	6.92



Natural Grasslands habitat

Natural Grasslands TEC habitat condition scores for the seven habitat monitoring sites ranged between 6.07 and 8.93 (Table 17). The seven assessment sites supported between three and four TEC indicator grass species (Table 18). While additional species are likely to have been present, some individuals could not be identified to species level due to the dry conditions and as a consequence, lack of fertile material. Notably, *Dichanthium queenslandicum* was confirmed at three of the seven sites, including both the Harry's paddock monitoring sites and one of the three Contours paddock monitoring sites.

		No Prom	orth ienade	На	rry's	Contours			
Scientific name	Common name	LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRL05	LEXRL06	LEXRL07	
Aristida latifolia	Feather-top wiregrass								
Aristida leptopoda	White speargrass	✓	~					✓	
Astrebla elymoides	Hoop mitchell grass								
Astrebla lappacea	Curly mitchell grass								
Astrebla squarrosa	Bull mitchell grass								
Bothriochloa erianthoides	Satin-top grass	✓	✓			✓		✓	
Dichanthium queenslandicum	King blue-grass			✓	✓	~			
Dichanthium sericeum	Queensland bluegrass	✓	✓	✓	✓	~	✓	✓	
Eriochloa crebra	Cup grass								
Panicum decompositum	Native millet	✓	✓	✓	✓	~	✓	✓	
Panicum queenslandicum	Yabila grass						✓		
Paspalidium globoideum	Shot grass								
Thellungia advena	Coolibah grass								
	TOTAL	4	4	3	3	4	3	4	

 Table 29: Natural Grasslands TEC indicator species at the Lexington Rail Loop offset site.

Natural Grassland quality assessments were conducted at each of the seven habitat condition sites within a 50 m x 20 m plot. This included an assessment of the species richness of Natural Grassland TEC indicator species, density of grass tussocks, shrub cover and non-native plant cover. The results of this assessment (Table 19) indicated that four of the condition sites (LEXRL01, LEXRL02, LEXRL05 and LEXRL07) were in 'best' condition, with the remaining three sites (LEXRL03, LEXRL04 and LEXRL06) being only in 'good' condition, largely attributed to the presence of only three perennial indicator grass species, with both of the Harry's paddock sites being in only 'good' condition despite the presence of *Dichanthium queenslandicum*.



	No Promena	rth ade	Harry's		Contou	rs	
TEC quality criteria	LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRLOS	LEXRL06	LEXRL07
Perennial indicator grass species	4	4	3	3	4	3	4
Number of native grass tussocks	>200	>200	>200	>200	>200	>200	>200
Woody shrub canopy cover (%)	<5	<5	<5	<5	<5	<5	<5
Perennial non-native plant cover (%)	9.1	1.15	9.8	2.25	0	0.5	3.4
Condition class	Best	Best	Good	Good	Best	Good	Best

Table 30: Condition classes for the Natural Grasslands TEC at the Lexington Rail Loop offset site.

King blue-grass habitat

King blue-grass habitat condition scores for the seven habitat monitoring sites ranged between 6.07 and 8.93 (Table 17). King-blue grass was positively identified from three of the seven habitat condition assessment plots at the time of surveying, present as single tussocks (Site LEXRL06) up to a population at LEXRL04 of 20-50 tussocks (Figure 34). Outside of the habitat condition assessment plots, the only confirmed population of king blue-grass was within the LEXRL12 weed monitoring plot, where a population of over 100 tussocks was confirmed (Figure 33).



Figure 33: Population of >100 king blue-grass (*Dichanthium queenslandicum*) tussocks in the foreground, with the taller, more upright *Dichanhtium sericeum* in the background.



King blue-grass population size 1-2 •





6.2 PHOTO MONITORING

Photo monitoring of the Lexington Rail Loop offset sites showed consistent levels of high grass cover across the Harry's and Contours paddocks (Site LEXRL05: refer to Photo G-43 in Appendix G), with slightly reduced grass cover in the North Promenade paddock (Site LEXRL09: refer to Photo G-80 in Appendix G). Variability in the ground cover within the North Promenade and Harry's paddocks is likely a consequence of cattle grazing and horse grazing (respectively) in the two paddocks. Ongoing management and concurrent photo monitoring should detect improvements in these paddocks over time, as the grassland continues to mature and recover from these disturbances. The results of the photo monitoring in the MDS Rail Loop site is presented in Appendix G.

6.3 WEED MONITORING

A total of 15 weed species were identified from the 12 weed monitoring plots. No additional species of weeds were observed on the site outside of those identified within the weed monitoring plots. Across the 12 weed monitoring plots, the average number of weed species observed per plot was 4.8 species, ranging between one species (Site LEXRL05, LEXRL07 and LEXRL11) and 10 species (Site LEXRL02 and LEXRL09), with three weed species only encountered at single sites. Weed cover across the 12 weed monitoring plots averaged 11.5%; ranging between 0.1% (Site LEXRL07) and 39.1% (Site LEXRL09)(Table 31 and Figure 35).

The number of weed species differed by offset paddock, with the North Promenade paddock having a higher weed species richness and average cover (8.75 species and 24.2% cover) than Harry's (5 species and 10.0% cover), with Contours having the lowest weed species richness and average cover of all three paddocks (1.6 species and 2.3% cover).

The most commonly encountered weed was *Parthenium hysterophorus* which was recorded from eight of the 12 sites (Table 31). *Parthenium hysterophorus* also had the highest average cover of 8.2%, followed by *Cucumis myriocarpus* which from the four sites it was encountered at, had an average cover of 7.5%. Nine of the 15 weed species (60%) had average covers <0.5%.



Table 31: Results of weed monitoring assessments at the Lexington Rail Loop offset site.

Scientific name	Common name	Eamily name	Percentage cover of weed species from given site amily name													
Scientific fiame			LEXRL01	LEXRL02	LEXRL03	LEXRL04	LEXRL05	LEXRL06	LEXRL07	LEXRL08	LEXRL09	LEXRL10	LEXRL11	LEXRL12	# sites	
Bidens bipinnata	Bipinnate Beggar's Ticks	Asteraceae		0.2						0.1					2	0.2
Lactuca serriola	Prickly Lettuce	Asteraceae		0.1						0.1	0.2				3	0.1
Parthenium hysterophorus	Parthenium Weed	Asteraceae	19.2	2.8	0.8	6.4				8.0	15.1	4.3	8.8		8	8.2
Sonchus oleracea	Sow Thistle	Asteraceae		0.2						0.1	0.1				3	0.1
Verbesina encelioides	Goldweed	Asteraceae	0.1												1	0.1
Cucumis myriocarpus	Paddy Melon	Cucurbitaceae	5.2	0.6						3.6	20.9				4	7.5
Vachellia farnesiana	Mimosa Bush	Fabaceae	1.9	4.5				0.5		5.5	0.1				5	2.5
Sida spinosa	Sida	Malvaceae		0.1											1	0.1
Cenchrus ciliaris	Buffel Grass	Роасеае	0.6	0.5						1.0	0.5			1.1	5	0.7
Dichanthium aristatum	Angleton Grass	Роасеае				8.0	0.5					5.1			3	4.5
Melinis repens	Red Natal Grass	Роасеае			0.1	0.3						0.7		0.4	4	0.4
Sorghum halepense	Johnson Grass	Poaceae	0.1		0.3	0.1					0.1	0.1			5	0.1
Rumex crispus	Curled Dock	Polygonaceae									0.1				1	0.1
Physalis lanceifolia	Goosberry	Solanaceae	1.2	0.9	2.9						2.0				4	1.7
Verbena officinalis	Common Verbena	Verbenaceae		0.4	0.4	0.1		0.1	0.1	1.0	0.1	0.3		0.1	9	0.3
	·	# species	7	10	5	5	1	2	1	8	10	5	1	3		·
		Weed cover (%) ^b	28.2	10.2	4.5	14.9	0.5	0.6	0.1	19.3	39.1	10.5	8.8	1.6		

^a Avg cover (%) represents the average percentage cover of a given weed species across encountered sites.

^b Weed cover represents the sum of the average weed cover percentages of all weed species.



vet_monitoring_report/200710 - Figure 35 - LEXINGTON RAIL LOOP weed moni	Sojitz Blue Pty Ltd - Lexington Rail Loop offset						Location diagram
DS_post_	Figure 35 Lexington Rail Loop offset Weed monitoring results - west	Lexington existing fences	Observed vegetation	Weed monitoring pl	ots 🔜 11 - 15		E.
/_Lex_M		- Access tracks	E 11.8.11	Weed cover (%)	16 - 25		- Arris
0200627		Lexington offset area	RE 11.8.5	< 5	26 - 50		
LZ \918_2		Mining leases (ML70376 and ML70145)		6 - 10	51 - 100		
cts\Sojit		Lexington Rail Loop offset				Brishane	
?:\GISData\Projex	DATA SOURCE: The following datasets are © State of Qld: - Mining leases The following datasets provided by Sojitz - Lexington Rail Loop offset areas	C North Promenade paddock			00 150 200 ^h		
ath: F	Date: 7/16/2020 Coordinate System: GDA 1994 MGA Zone 55 Projection	n: Transverse Mercator Datum: GDA 1994 Scale: 1:6,000@A	\3	IVIE	1165	Australia	



Figure 36 Lexington Rail Loop offset Weed monitoring results - east DATA SOURCE: The following datasets are © State of Old: - Mining leases The following datasets provided by Sojitz - Lexington Rail Loop offset areas	 Lexington existing fences Access tracks RE 11.8.11 Lexington Rail Loop offset RE 11.8.5 Harry's paddock Contours paddock 	ion :::::: Weed monitoring plots 11 - 15 Weed cover (%) 16 - 25 < 5 26 - 50 $6 - 10$ 51 - 100 0 200 400 600 800 Metres Metres	N CCO2


6.4 **BIOMASS MONITORING**

Brigalow Belt pasture photo standards were used for all biomass monitoring points. 'Downs country' photo standards were used for monitoring all twelve of the sites comprising RE 11.8.11 (Table 32). Where the observed biomass at a site was mid-way between two photos within a given biomass standard, the middle of the corresponding range was reported (i.e. observed biomass between 3,015 kg/ha and 3,850 kg/ha 'Downs country' photo standards was reported as 3,433 kg/ha).

Photo monitoring showed some variability in biomass of ground cover across all 12 photo monitoring sites. Overall, there was a high biomass for the grassland vegetation type, with a biomass ranging between 3,015 kg/ha and 5,040 kg/ha. The average biomass varied considerably between the offset paddocks, with the average biomass at Contours (4,921 kg/ha) greater than at Harry's (4,365 kg/ha) and greater again than at North Promenade (3,681 kg/ha).

Table 32: Results of biomass monitoring on the Lexington Rail Loop offset site using Brigalow Belt Future Beef pasture photo standards.

		Brigalow Belt Future Beef pasture photo standard type	
Photo monitoring site*	RE type	Downs country	Biomass kg/ha
LEXRL01 – North Promenade paddock	11.8.11	\checkmark	4,445
LEXRL02 – North Promenade paddock	11.8.11	\checkmark	3,850
LEXRL03 – Harry's paddock	11.8.11	\checkmark	3,015
LEXRL04 – Harry's paddock	11.8.11	\checkmark	5,040
LEXRL05 – Contours paddock	11.8.11	\checkmark	5,040
LEXRL06 – Contours paddock	11.8.11	\checkmark	4,445
LEXRL07 – Contours paddock	11.8.11	\checkmark	5,040
LEXRL08 – North Promenade paddock	11.8.11	\checkmark	3,850
LEXRL09 – North Promenade paddock	11.8.11	\checkmark	2,578
LEXRL10 – Harry's paddock	11.8.11	✓	5,040
LEXRL11 – Contours paddock	11.8.11	\checkmark	5,040
LEXRL12 – Contours paddock	11.8.11	\checkmark	5,040

* taken from the 0 m point of the permanent habitat monitoring transects (Sites LEXRL01 – LEXRL07) and the SW corner of the standalone weed monitoring plots (Sites LEXRL08 – LEXRL12).

6.5 GENERAL SITE INSPECTION

It is understood that a share-farming agreement is in place to limit the head of cattle per paddock. A herd of 5-6 horses was encountered on a number of days within Harry's Paddock, with evidence throughout the paddock of horse manure. Likewise, cattle were observed within Contours paddock and in the vicinity of the southern boundary of North Promenade paddock.

All fences bounding the paddocks were in good condition. Access to many of the monitoring sites in the Contours paddock was via an access track outside of and adjacent to the western boundary of the paddock, whereas access to monitoring sites in Harry's paddock was via Wurba Road and access to the North Promenade monitoring sites was via existing access tracks into Lexington.





Figure 37: Horses in Harry's paddock.



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APPENDIX A MONITORING SITE LOCATIONS

MDS PROJECT SITE

Table A-1: Post-wet-season monitoring site locations and purpose on the MDS Project site.

								Pest anima	l monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	H01_0m	641462	7304249	\checkmark	Sourcetton mission	\checkmark				
	H01_50m	641462	7304301	\checkmark	Squatter pigeon	✓				
01	W01_01	641462	7304249	\checkmark		✓	✓			
01	W01_02	641462	7304301				✓			
	W01_03	641462	7304348				✓			
	R01	641462	7304249	\checkmark				~		
	H02_0m	640199	7303572	\checkmark	Natural Granda TEC, King blue grand blue grand	✓		~		
	H02_50m	640203	7303621	✓	- Natural Grassiands TEC, King blue-grass, bluegrass	✓		✓		
02	W02_01	640199	7303572	\checkmark		✓	\checkmark			
02	W02_02	640203	7303621				✓			
	W02_03	640210	7303627				\checkmark			
	R02	640199	7303572	\checkmark				✓		
	H03_0m	638418	7303259	\checkmark		✓				
00	H03_50m	638425	7303308	✓	- squatter pigeon	✓				
03	W03_01	638418	7303259	\checkmark		✓	✓			
	W03_02	638425	7303308				\checkmark			



								Pest animal monitoring			
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera	
	W03_03	638430	7303358				✓				
	R03	638418	7303259	\checkmark				✓			
	H04_0m	637945	7300236	✓	Natural Grasslands TEC King blue-grass bluegrass	✓					
	H04_50m	637951	7300287	✓		✓					
04	W04_01	637945	7300236	\checkmark		✓	✓				
04	W04_02	637951	7300287				\checkmark				
	W04_03	637950	7300338				\checkmark				
	R04	637945	7300236	\checkmark				~			
	H05_0m	638426	7299836	\checkmark		✓					
	H05_50m	638420	7299885	\checkmark	Squatter pizzen	✓					
05	W05_01	638426	7299836	\checkmark	Squarrer pigeon	✓	✓				
05	W05_02	638420	7299885				✓				
	W05_03	638416	7299937				✓				
	R05	638426	7299836	✓				✓			
	H06_0m	637445	7299566	✓	Natural Creation to TEC, King blue group, blue group	✓					
	H06_50m	637447	7299615	✓	Natural Grassianos TEC, King blue-grass, bluegrass	~					
00	W06_01	637445	7299566	✓		✓	✓				
06	W06_02	637447	7299615				✓				
	W06_03	637443	7299668								
	R06	637445	7299566	✓				✓			



								Pest anima	l monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	H07_0m	638426	7298876	\checkmark	Prigalow TEC	✓				
	H07_50m	638419	7298926	\checkmark	bilgalow rec	\checkmark				
07	W07_01	638426	7298876	✓		\checkmark	✓			
07	W07_02	638419	7298926				✓			
	W07_03	638423	7298974				~			
	R07	638426	7298876	\checkmark				✓		
	H08_0m	637032	7298735	\checkmark	Natural Grasslands TEC, King blue-grass, bluegrass	\checkmark				
	H08_50m	637034	7298785	✓		\checkmark				
00	W08_01	637032	7298735	✓		\checkmark	✓			
08	W08_02	637034	7298785				~			
	W08_03	637039	7298835				~			
	R08	637032	7298735	\checkmark				✓		
	H09_0m	638387	7298599	\checkmark	Australian painted chine	\checkmark				
	H09_50m	638380	7298648	\checkmark	Australian painteu shipe	\checkmark				
00	W09_01	638387	7298599	\checkmark		\checkmark	~			
09	W09_02	638380	7298648				~			
	W09_03	638372	7298699				~			
	R09	638387	7298599	✓				✓		
10	H10_0m	636412	7297523	✓	Squatter pizzen	✓				
10	H10_50m	636415	7297571	✓	- Squarrei bigeon	✓				



								Pest anima	Imonitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W10_01	636412	7297523	✓		✓	✓			
	W10_02	636415	7297571				✓			
	W10_03	636413	7297617				✓			
	R10	636412	7297523	✓				✓		
	W11_01	642941	7304772	✓		✓	\checkmark			
11	W11_02	642937	7304825				\checkmark			
	W11_03	642938	7304876				✓			
	W12_01	641428	7303597	✓		✓	\checkmark			
12	W12_02	641426	7303646				\checkmark			
	W12_03	641429	7303696				\checkmark			
	W13_01	641896	7303196	\checkmark		✓	\checkmark			
13	W13_02	641899	7303247				\checkmark			
	W13_03	641900	7303297				\checkmark			
	W14_01	638991	7303038	\checkmark		✓	\checkmark			
14	W14_02	638987	7303090				\checkmark			
	W14_03	638988	7303140				✓			
	W15_01	637797	7302245	✓		✓	✓			
15	W15_02	637796	7302296				~			
	W15_03	637796	7302347				~			
16	W16_01	638556	7300785	✓		✓	✓			



								Pest animal monitoring				
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera		
	W16_02	638560	7300832				✓					
	W16_03	638566	7300882				✓					
	W17_01	637029	7300184	✓		✓	✓					
17	W17_02	637028	7300231				✓					
	W17_03	637024	7300282				✓					
	W18_01	637401	7300321	✓		✓	\checkmark					
18	W18_02	637401	7300368				\checkmark					
	W18_03	637398	7300421				\checkmark					
	W19_01	638301	7301720	✓		\checkmark	\checkmark					
19	W19_02	638295	7301771				✓					
	W19_03	638290	7301821				✓					
	W20_01	636740	7298674	✓		~	✓					
20	W20_02	636746	7298723				✓					
	W20_03	636752	7298771				✓					
	P01_01	636412	7297523						✓			
21	P01_02	636412	7297423						✓			
	P01_03	636412	7297323						✓			
	P02_01	636397	7298627						✓			
22	P02_02	636397	7298527						✓			
	P02_03	636397	7298427						✓			



								Pest anima	monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	P03_01	637232	7298835						✓	
23	P03_02	637232	7298735						✓	
	P03_03	637232	7298635						✓	
	P04_01	638126	7299076						✓	
24	P04_02	638126	7298976						✓	
	P04_03	638126	7298876						\checkmark	
	P05_01	638126	7299836						✓	
25	P05_02	638126	7299736						\checkmark	
	P05_03	638126	7299637						✓	
	P06_01	638156	7300985						\checkmark	
26	P06_02	638156	7300885						\checkmark	
	P06_03	638156	7300785						\checkmark	
	P07_01	638992	7303366						\checkmark	
27	P07_02	638992	7303266						\checkmark	
	P07_03	638992	7303166						\checkmark	
	P08_01	641150	7303945						\checkmark	
28	P08_02	641150	7303845						\checkmark	
	P08_03	641150	7303745						\checkmark	
29	C01	642069	7303364							\checkmark
30	C02	641096	7303802							\checkmark



								Pest anima	l monitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
31	C03	639777	7303065							\checkmark
32	C04	638324	7301905							\checkmark
33	C05	638692	7301073							\checkmark
34	C06	638685	7300013							✓
35	C07	638679	7299497							✓
36	C08	638419	7298830							✓
37	C09	637498	7300708							✓
38	C10	637519	7300049							✓
39	C11	637050	7299119							✓
40	C12	636843	7298531							✓
41	C13	636494	7297829							✓
42	C14	636293	7297414							✓
43	C15	636936	7297300							\checkmark

^a Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha rabbit monitoring plot, P = start point (west) of each site's pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha rabbit monitoring plot, P = start point (west) of each site's pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for habitat assessment, weed monitoring and rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.



LEXINGTON OFFSET SITE

Table A-2: Post-wet season monitoring site locations and purpose on the Lexington offset site

							Pest animal mor	nitoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W01_01	604331	7354000	\checkmark	\checkmark	\checkmark			
01	W01_02	604331	7353950			\checkmark			
01	W01_03	604331	7353900			\checkmark			
	R01	604331	7353900	\checkmark			~		
	W02_01	603925	7353100	\checkmark	\checkmark	\checkmark			
02	W02_02	603908	7353053			\checkmark			
02	W02_03	603892	7353005			\checkmark			
	R02	603892	7353005	\checkmark			~		
	W03_01	604380	7352577	\checkmark	\checkmark	\checkmark			
02	W03_02	604380	7352527			\checkmark			
03	W03_03	604380	7352477			\checkmark			
	R03	604380	7352477	✓			✓		
	W04_01	603904	7351791	✓	\checkmark	\checkmark			
	W04_02	603904	7351741			✓			
04	W04_03	603904	7351691			✓			
	R04	603904	7351691	✓			✓		
	W05_01	603360	7351127	\checkmark	✓	✓			
05	W05_02	603345	7351079			\checkmark			
	W05_03	603330	7351031			✓			



			· ·	·	·		Pest animal mon	itoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	R05	603426	7351001	✓			✓		
	W06_01	604790	7351295	✓	✓	\checkmark			
06	W06_02	604790	7351245			\checkmark			
	W06_03	604790	7351195			\checkmark			
	W07_01	604649	7350850	\checkmark	\checkmark	\checkmark			
07	W07_02	604649	7350800			\checkmark			
07	W07_03	604649	7350750			\checkmark			
	R06	604649	7350750	~			✓		
	W08_01	606488	7350461	~	×	\checkmark			
00	W08_02	606488	7350411			\checkmark			
08	W08_03	606488	7350361			\checkmark			
	R07	606488	7350361	~			✓		
	W09_01	607401	7351233	~	~	\checkmark			
09	W09_02	607401	7351183			\checkmark			
	W09_03	607401	7351133			\checkmark			
	W10_01	607175	7351671	✓	~	\checkmark			
10	W10_02	607175	7351621			\checkmark			
10	W10_03	607175	7351571			\checkmark			
	R08	607175	7351571	✓			✓		
	W11_01	609631	7353204	\checkmark	\checkmark	\checkmark			
11	W11_02	609631	7353154			\checkmark			



			· · ·				Pest animal mon	itoring	
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W11_03	609631	7353104			\checkmark			
	R09	609631	7353104	\checkmark			✓		
	W12_01	610371	7353217	\checkmark	✓	\checkmark			
12	W12_02	610371	7353167			\checkmark			
	W12_03	610371	7353117			\checkmark			
	W13_01	610237	7352615	\checkmark	\checkmark	\checkmark			
10	W13_02	610237	7352565			\checkmark			
13	W13_03	610237	7352515			\checkmark			
	R10	610237	7352515	\checkmark			✓		
	W14_01	604883	7354051	\checkmark	✓	\checkmark			
14	W14_02	604883	7354001			\checkmark			
	W14_03	604883	7353951			\checkmark			
	W15_01	604543	7352984	\checkmark	✓	\checkmark			
15	W15_02	604543	7352934			\checkmark			
	W15_03	604543	7352884			\checkmark			
	W16_01	604604	7352289	\checkmark	✓	\checkmark			
16	W16_02	604604	7352239			\checkmark			
	W16_03	604604	7352189			\checkmark			
	W17_01	604503	7351656	\checkmark	✓	\checkmark			
17	W17_02	604503	7351606			\checkmark			
	W17_03	604503	7351556			\checkmark			



		·				·	Pest animal monitoring		
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera
	W18_01	604074	7350714	✓	\checkmark	✓			
18	W18_02	604074	7350664			✓			
	W18_03	604074	7350614			✓			
	W19_01	603812	7352530	\checkmark	\checkmark	\checkmark			
19	W19_02	603798	7352482			\checkmark			
	W19_03	603784	7352434			\checkmark			
	W20_01	610453	7352923	✓	\checkmark	\checkmark			
20	W20_02	610453	7352873			✓			
	W20_03	610453	7352823			\checkmark			
	P01_01	604442	7353084					✓	
21	P01_02	604442	7352984					✓	
	P01_03	604442	7352884					✓	
	P02_01	603879	7351891					✓	
22	P02_02	603879	7351791					✓	
	P02_03	603879	7351691					✓	
	P03_01	604513	7354397					✓	
23	P03_02	604513	7354297					✓	
	P03_03	604513	7354197					✓	
	P04_01	604624	7350950					✓	
24	P04_02	604624	7350850					\checkmark	
	P04_03	604624	7350750					\checkmark	



		· · ·	·	-	· · · ·		Pest animal monitoring					
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera			
	P05_01	606463	7350561					 ✓ 				
25	P05_02	606463	7350461					✓				
	P05_03	606463	7350361					✓				
	P06_01	607101	7351233					✓				
26	P06_02	607101	7351133					\checkmark				
	P06_03	607101	7351033					\checkmark				
	P07_01	607092	7351771					×				
27	P07_02	607092	7351671					✓				
	P07_03	607092	7351571					×				
	P08_01	609840	7353261					✓				
28	P08_02	609840	7353161					✓				
	P08_03	609840	7353061					✓				
29	C01	604003	7354128						✓			
30	C02	604006	7353171						✓			
31	C03	603871	7352215						✓			
32	C04	603885	7351500						✓			
33	C05	605051	7354267						✓			
34	C06	604978	7353531						✓			
35	C07	604885	7352747						✓			
36	C08	604776	7352174						\checkmark			
37	C09	604705	7351408						✓			



	· · · · ·						Pest animal mon			
Site	Start point name ^a	Easting	Northing	Star picket?	Photo monitoring	Weed monitoring	Rabbit plot	Feral pig plot	Fauna camera	
38	C10	604402	7350811						\checkmark	
39	C11	604107	7350032						\checkmark	
40	C12	605496	7350889						\checkmark	
41	C13	606580	7350889						✓	
42	C14	610156	7352282						✓	
43	C15	610612	7353100						✓	

^a Start points with prefix W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3), R = start point (south-west) of 2 ha European rabbit monitoring plot, P = start point (west) of each site's feral pig monitoring plot transects (PXX_01, PXX_02 and PXX_03 corresponds to transect 1, 2 and 3), C = fauna camera station. Start points for weed monitoring and European rabbit monitoring plots are the same for sites 01 – 10, with sites 11 – 20 only corresponding to weed monitoring plots.



MDS RAIL LOOP SITE

Table A-3: Post-wet-season monitoring site locations and purpose on the MDS Rail Loop site

Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	H01_0m	645575	7303101	✓	Natural Grasslands TEC King hlue-grass	✓		
	H01_50m	645575	7303151	✓		✓		✓
MDSRL01	W01_01	645575	7303101	✓		✓	✓	
	W01_02	645575	7303151				✓	
	W01_03	645575	7303201				\checkmark	
	H02_0m	646410	7303007	✓	Natural Grasslands TEC, King blue-grass	✓		
	H02_50m	646410	7303057	✓		✓		✓
MDSRL02	W02_01	646410	7303007	✓		✓	✓	
	W02_02	646410	7303057				\checkmark	
	W02_03	646410	7303107				\checkmark	
	H03_0m	646666	7303114	✓	Natural Grasslands TEC, King blue grass	✓		
	H03_50m	646666	7303164	✓	Natural Grassianus TEC, King Dide-grass	\checkmark		✓
MDSRL03	W03_01	646666	7303114	✓		✓	✓	
	W03_02	646666	7303164				\checkmark	
MDSRL04	W03_03	646666	7303214				\checkmark	
	H04_0m	646834	7303291	✓	Natural Grasslands TEC, King blue grass	✓		
	H04_50m	646834	7303341	✓	Natural Grasslands TEC, King blue-grass			\checkmark
	W04_01	646834	7303291	✓		\checkmark	\checkmark	



Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	W04_02	646834	7303341				\checkmark	
	W04_03	646834	7303391				\checkmark	
	W05_01	646409	7303255	✓		✓	✓	
MDSRL05	W05_02	646409	7303305				✓	
	W05_03	646409	7303355				✓	

^a Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3). Start points for habitat assessment and weed monitoring plots are the same for sites 01 – 04, with site 05 only corresponding to a standalone weed monitoring plot.



LEXINGTON RAIL LOOP SITE

Table A-4: Post-wet-season monitoring site locations and purpose on the MDS Rail Loop site

Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	H01_0m	604390	7355247	✓	Natural Grasslands TEC King blue-grass	✓		
	H01_50m	604390	7355297	✓		✓		
LEXRL01	W01_01	604390	7355247	✓		✓	✓	
	W01_02	604390	7355297				✓	
	W01_03	604390	7355347				\checkmark	
	H02_0m	604758	7354797	✓	Natural Granda TEC Vias blue gran	✓		
_	H02_50m	604758	7354847	✓	Natural Grassiands TEC, King blue-grass	✓		
LEXRL02	W02_01	604758	7354797	✓		✓	✓	
	W02_02	604758	7354847				✓	
	W02_03	604758	7354897				✓	
	H03_0m	608595	7355228	✓	Natural Crasslands TEC, King blue grass	✓		
	H03_50m	608595	7355278	✓	Natural Grassianus TEC, King Dide-grass	✓		
LEXRL03	W03_01	608595	7355228	✓		✓	✓	
	W03_02	608595	7355278				✓	
LEXRLO4	W03_03	608595	7355328				✓	
	H04_0m	609262	7355036	✓	Natural Crasslands TEC, King blue grass	✓		
	H04_50m	609262	7355086	✓	Natural Grasslands TEC, King blue-grass			
	W04_01	609262	7355036	✓		\checkmark	✓	



Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	W04_02	609262	7355086				✓	
	W04_03	609262	7355136				✓	
	H05_0m	612011	7354575	\checkmark	Natural Grasslands TEC, King blue grass	✓		
	H05_50m	612011	7354625	\checkmark	Natural Grassianus TEC, King blue-grass	\checkmark		
LEXRL05	W05_01	612011	7354575	✓		✓	✓	
	W05_02	612011	7354625				✓	
V	W05_03	612011	7354675				✓	
1	H06_0m	611834	7354280	\checkmark	Natural Crasslands TEC, King blue, grass	\checkmark		
	H06_50m	611834	7354330	\checkmark	Natural Grassianus TEC, King blue-grass	\checkmark		
LEXRL06	W06_01	611834	7354280	\checkmark		\checkmark	✓	
	W06_02	611834	7354330				✓	
	W06_03	611834	7354380				✓	
	H07_0m	611215	7353711	~	Natural Crassiands TEC, King blue, grass	~		
	H07_50m	611215	7353761	✓	Natural Grassianus TEC, King Diue-grass	✓		
LEXRL07	W07_01	611215	7353711	✓		✓	✓	
	W07_02	611215	7353761				✓	
	W07_03	611215	7353811				✓	
	W08_01	604126	7354813	~		\checkmark	~	
LEXRL08	W08_02	604126	7354863				✓	
	W08_03	604126	7354913				✓	



Site	Start point name ^a	Easting	Northing	Star picket?	Habitat condition MNES values	Photo monitoring	Weed monitoring	Biomass monitoring
	W09_01	604978	7355196	✓		\checkmark	\checkmark	
LEXRL09	W09_02	604978	7355246				\checkmark	
	W09_03	604978	7355296				\checkmark	
	W010_01	609785	7355039	~		\checkmark	\checkmark	
LEXRL10	W010_02	609785	7355089				✓	
	W010_03	609785	7355139				✓	
	W11_01	611630	7353857	~		\checkmark	✓	
LEXRL11	W11_02	611630	7353907				\checkmark	
	W11_03	611630	7353957				\checkmark	
	W12_01	612344	7354534	✓		\checkmark	✓	
LEXRL12	W12_02	612344	7354584				✓	
	W12_03	612344	7354634				✓	

^a Start points with prefix H = habitat assessment sites (HXX_0m and HXX_50m corresponds to 0 m and 50 m point of north-south habitat assessment transect), W = start point (west) of each site's weed monitoring plot transects (WXX_01, WXX_02 and WXX_03 corresponds to transect 1, 2 and 3). Start points for habitat assessment and weed monitoring plots are the same for sites 01 – 07, with sites 08 – 12 only corresponding to a standalone weed monitoring plot.



APPENDIX B MDS RAIL LOOP SITE – YEAR 1 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 1 monitoring period at the MDS Rail Loop site. Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition and flora species stocking rates were collected as part of detailed field surveys in June 2020. The site context score was calculated in accordance with the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), derived from ground-truthed regional ecosystem mapping within the extent of the MDS Rail Loop, as presented in the MDS Rail Loop ecological assessment (SLR 2019b).

Table B-1: Site condition raw data for each RE assessment unit

	Si	te MDSRL(RE 11.8.11)1	Si	te MDSRL RE 11.8.11	0 2	Si	te MDSRL(RE 11.8.11)3	Site MDSRL04 RE 11.8.11		
Ecological condition indicators	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score
Recruitment of woody perennial species	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - trees	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - shrubs	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - grasses	7	11	3	6	11	3	8	11	3	8	11	3
Native plant species richness - forbs	4	17	2.5	3	17	2.5	4	17	2.5	5	17	3
Tree canopy height	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy height	-	-	-	-	-	-	-	-	-	-	-	-
Tree canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Shrub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-
Native perennial grass cover	67	43	5	44	43	5	21	43	1	21	43	1
Organic litter	23	13	5	22	13	5	38.6	13	3	28	13	3
Large eucalypt trees	-	-	-	-	-	-	-	-	-	-	-	-
Large non-eucalypt trees	-	-	-	-	-		-	-	-	-	-	
Coarse woody debris	-	-	-	-	-	-	-	-	-	-	-	-
Non-native plant cover	4.45	0	10	4.75	0	10	13.4	0	5	21.6	0	5
Total			25.5			25.5			14.5			15
/10			8.50			8.50			4.83			5.00



Table B-2: Summary of the site condition, site context and fauna species habitat index scores used to calculate the habitat condition score for each RE assessment unit

	Site MDSRL01	Site MDSRL02	Site MDSRL03	Site MDSRL04
	RE 11.8.11	RE 11.8.11	RE 11.8.11	RE 11.8.11
MNES values	Natural Grasslands TEC, King blue-grass	Natural Grasslands TEC, King blue-grass	Natural Grasslands TEC, King blue-grass	Natural Grasslands TEC, King blue-grass
Site condition		1	1	
Recruitment of woody perennial species	-	-	-	-
Native plant species richness - trees	-	-	-	-
Native plant species richness - shrubs	-	-	-	-
Native plant species richness - grasses	3	3	3	3
Native plant species richness - forbs	2.5	2.5	2.5	3
Tree canopy height	-	-	-	-
Tree canopy cover	-	-	-	-
Shrub canopy cover	-	-	-	-
Native perennial grass cover	5	5	1	1
Organic litter	5	5	3	3
Large trees	-	-	-	-
Coarse woody debris	-	-	-	-
Non-native plant cover	10	10	5	5
Total of BioCondition attributes	25.5	25.5	14.5	15
MAX ecological condition score	30	30	30	30
Score /10	8.50	8.50	4.83	5.00
Site context				
Size of patch (fragmented bioregions)	10	10	10	10
Connectivity (fragmented bioregions)	5	5	5	5
Context (fragmented bioregions)	5	4	4	4
Distance to permanent watering point (intact bioregions)	-	-	-	-
Ecological corridors	6	4	4	4
Total of site context attributes	26	23	23	23
MAX site condition score	26	26	26	26
Score /10	10.00	8.85	8.85	8.85



Table B-3: Summary of the species stocking rate index for king blue-grass

Spacing stacking rate /2ª	Site MDSRL01	Site MDSRL02	Site MDSRL03	Site MDSRL04
Species stocking rate / S	RE 11.8.11	RE 11.8.11	RE 11.8.11	RE 11.8.11
King blue-grass				
 Absent/not confirmed = 0 				
– up to 2 tussocks = 2	0	0	0	0
 between 3 and 20 tussocks = 2.5 				
 20 or more tussocks = 3 				

^a species stocking rate contributes 20% toward the habitat condition score for King blue-grass, with the remaining 80% made up of site condition and site context.

Table B-4: Summary of the MNES habitat condition score for each RE assessment unit

Accessment unit habitat condition score (10	Site MDSRL01	Site MDSRL02	Site MDSRL03	Site MDSRL04	Average habitat
Assessment unit habitat condition score / 10	RE 11.8.11	RE 11.8.11	RE 11.8.11	RE 11.8.11	condition score
Natural Grasslands TEC – calculated based on site condition (/80) + site context (/26) converted to score out of 10	9.20	8.66	6.70	6.79	7.83
 King blue-grass calculated based on combination of: habitat quality (site condition + site context) - 80% species stocking rate (score out of 3) - 20% 	7.36	6.93	5.36	5.43	6.27



APPENDIX C LEXINGTON RAIL LOOP OFFSET SITE – YEAR 1 HABITAT CONDITION ASSESSMENT

The following tables provide details of the habitat condition assessments undertaken during the Year 1 monitoring period at the Lexington Rail Loop offset site. Habitat condition scores were calculated in accordance with the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017). The data required to inform the site condition and flora species stocking rates were collected as part of detailed field surveys in June 2020. The site context score was calculated in accordance with the method prescribed in the *Guide to Determining Terrestrial Habitat Quality version 1.2* (DEHP, 2017), derived from ground-truthed regional ecosystem mapping within the extent of the Lexington Rail Loop offset sites, as presented in the Lexington Rail Loop ecological assessment (SLR 2019b).

Table C-1: Site condition raw data for each RE assessment unit

		Site LEXRLO1 RE 11.8.11		Site LEXRL02 8 RE 11.8.11		Site LEX RE 11.8	RL03 11		Site LEX RE 11.8.	(RLO4 .11		Site LEX RE 11.8.	RL05 11		Site LEX RE 11.8.	RL06 .11		Site LEX RE 11.8	RL07 11		
Ecological condition indicators	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score	Raw data	Benchmark (11.8.11)	Score
Recruitment of woody perennial species	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - trees	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - shrubs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Native plant species richness - grasses	9	11	3	9	11	3	5	11	3	4	11	3	5	11	3	3	11	3	5	11	3
Native plant species richness - forbs	5	17	3	6	17	3	7	17	3	5	17	3	5	17	3	3	17	2.5	4	17	2.5
Tree canopy height	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy height	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tree canopy cover	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tree sub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Shrub canopy cover	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Native perennial grass cover	50	43	5	54	43	5	23	43	3	47	43	5	73	43	5	37	43	5	75.6	43	5
Organic litter	35	13	3	28	13	3	43	13	3	41	13	3	21.8	13	5	30.6	13	3	18.4	13	5
Large eucalypt trees	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Large non-eucalypt trees	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coarse woody debris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-native plant cover	9.1	0	5	1.15	0	10	9.5	0	5	2.25	0	10	0	0	10	0.5	0	10	3.4	0	10
Total			19			24			17			24			26			23.5			25.5
/10			6.33			8.00			5.67			8.00			8.67			7.83			8.50



	Site LEXRL01	Site LEXRL02	Site LEXRL03	Site LEXRL04	Site LEXRL05	Site LEXRL06 RE 11.8.11	Site LEXRL07 RE 11.8.11 Natural Grasslands TEC, King blue-grass
	RE 11.8.11						
MNES values	Natural Grasslands TEC, King blue-grass						
Site condition							
Recruitment of woody perennial species	-	-	-	-	-	-	-
Native plant species richness - trees	-	-	-	-	-	-	-
Native plant species richness - shrubs	-	-	-	-	-	-	-
Native plant species richness - grasses	3	3	3	3	3	3	3
Native plant species richness - forbs	3	3	3	3	3	2.5	2.5
Tree canopy height	-	-	-	-	-	-	-
Tree canopy cover	-	-	-	-	-	-	-
Shrub canopy cover	-	-	-	-	-	-	-
Native perennial grass cover	5	5	3	5	5	5	5
Organic litter	3	3	3	3	5	3	5
Large trees	-	-	-	-	-	-	-
Coarse woody debris	-	-	-	-	-	-	-
Non-native plant cover	5	10	5	10	10	10	10
Total of BioCondition attributes	19	24	17	24	26	23.5	25.5
MAX ecological condition score	30	30	30	30	30	30	30
Score /10	6.33	8.00	5.67	8.00	8.67	7.83	8.50
Site context							
Size of patch (fragmented bioregions)	10	10	10	10	10	10	10
Connectivity (fragmented bioregions)	5	5	5	5	5	5	5
Context (fragmented bioregions)	5	5	2	4	4	4	4
Distance to permanent watering point (intact bioregions)	-	-	-	-	-	-	-
Ecological corridors	6	6	0	0	0	0	0
Total of site context attributes	26	26	17	19	19	19	19
MAX site condition score	26	26	26	26	26	26	26
Score /10	10.00	10.00	6.54	7.31	7.31	7.31	7.31



Table C-3: Summary of the species stocking rate index for king blue-grass

Species stocking rate /3ª	Site LEXRL01	Site LEXRL02	Site LEXRL03	Site LEXRL04	Site LEXRL05	Site LEXRL06	Site LEXRL07
	RE 11.8.11						
King blue-grass							
 Absent/not confirmed = 0 							
 up to 2 tussocks = 2 	0	0	2.5	3	2	0	0
 between 3 and 20 tussocks = 2.5 							
 20 or more tussocks = 3 							

^a species stocking rate contributes 20% toward the habitat condition score for King blue-grass, with the remaining 80% made up of site condition and site context.

Table C-4: Summary of the MNES habitat condition score for each RE assessment unit

Assessment unit habitat condition score /10	Site LEXRL01	Site LEXRL02	Site LEXRL03	Site LEXRL04	Site LEXRL05	Site LEXRL06	Site LEXRL07	FINAL MNES habitat quality score
	RE 11.8.11							
Natural Grasslands TEC – calculated based on site condition (/80) + site context (/26) converted to score out of 10	8.04	8.93	6.07	7.68	8.04	7.59	7.95	7.76
 King blue-grass calculated based on combination of: habitat quality (site condition + site context) - 80% species stocking rate (score out of 3) - 20% 	6.43	7.14	6.52	8.14	7.76	6.07	6.36	6.92



APPENDIX D MDS PROJECT SITE PHOTO MONITORING



SITE 01 - H01_0M



Photo D-1 North

Photo D-2 East



Photo D-3 South

Photo D-4 West





SITE 01 - H01_50M



Photo D-6 North

Photo D-7 East



Photo D-8 South

Photo D-9 West



Photo D-10 Ground



SITE 02 – H02_0 M



Photo D-11 North

Photo D-12 East



Photo D-13 South

Photo D-14 West



Photo D-15 Ground



SITE 02 - H02_50M



Photo D-16 North

Photo D-17 East



Photo D-18 South

Photo D-19 West



Photo D-20 Ground



SITE 03 – H03_0M



Photo D-21 North

Photo D-22 East



Photo D-23 South

Photo D-24 West



Photo D-25 Ground



SITE 03 – H03_50M



Photo D-26 North

Photo D-27 East



Photo D-28 South

Photo D-29 West



Photo D-30 Ground



SITE 04 - H04_0M



Photo D-31 North

Photo D-32 East



Photo D-33 South

Photo D-34 West



Photo D-35 Ground



SITE 04 - H04_50M



Photo D-36 North

Photo D-37 East



Photo D-38 South

Photo D-39 West



Photo D-40 Ground


SITE 05 – H05_0M



Photo D-41 North

Photo D-42 East



Photo D-43 South

Photo D-44 West



Photo D-45 Ground



SITE 05 – H05_50M



Photo D-46 North

Photo D-47 East



Photo D-48 South

Photo D-49 West



Photo D-50 Ground



SITE 06 - H06_0M



Photo D-51 North

Photo D-52 East



Photo D-53 South

Photo D-54 West



Photo D-55 Ground



SITE 06 - H06_50M



Photo D-56 North

Photo D-57 East



Photo D-58 South

Photo D-59 West



Photo D-60 Ground



SITE 07 – H07_0M



Photo D-61 North

Photo D-62 East



Photo D-63 South

Photo D-64 West



Photo D-65 Ground



SITE 07 – H07_50M



Photo D-66 North

Photo D-67 East



Photo D-68 South

Photo D-69 West



Photo D-70 Ground



SITE 08 - H08_0M



Photo D-71 North

Photo D-72 East



Photo D-73 South

Photo D-74 West



Photo D-75 Ground



SITE 08 - H08_50M



Photo D-76 North

Photo D-77 East



Photo D-78 South

Photo D-79 West



Photo D-80 Ground



SITE 09 – H09_0M



Photo D-81 North

Photo D-82 East



Photo D-83 South

Photo D-84 West



Photo D-85 Ground



SITE 09 - H09_50M



Photo D-86 North

Photo D-87 East



Photo D-88 South

Photo D-89 West



Photo D-90 Ground



SITE 10 – H10_0M



Photo D-91 North

Photo D-92 East



Photo D-93 South

Photo D-94 West



Photo D-95 Ground



SITE 10 - H10_50M



Photo D-96 North

Photo D-97 East



Photo D-98 South

Photo D-99 West



Photo D-100 Ground



SITE 11 – W11_0



Photo D-101 North

Photo D-102 East



Photo D-103 South

Photo D-104 West



Photo D-105 Ground



SITE 12 – W12_0



Photo D-106 North

Photo D-107 East



Photo D-108 South

Photo D-109 West



Photo D-110 Ground



SITE 13 – W13_0



Photo D-111 North

Photo D-112 East



Photo D-113 South

Photo D-114 West



Photo D-115 Ground



SITE 14 – W14_0



Photo D-116 North

Photo D-117 East



Photo D-118 South

Photo D-119 West



Photo D-120 Ground



SITE 15 – W15_0



Photo D-121 North

Photo D-122 East



Photo D-123 South

Photo D-124 West



Photo D-125 Ground



SITE 16 – W16_0



Photo D-126 North

Photo D-127 East



Photo D-128 South

Photo D-129 West



Photo D-130 Ground



SITE 17 – W17_0



Photo D-131 North

Photo D-132 East



Photo D-133 South

Photo D-134 West



Photo D-135 Ground



SITE 18 - W18_0



Photo D-136 North

Photo D-137 East



Photo D-138 South

Photo D-139 West



Photo D-140 Ground



SITE 19 – W19_0



Photo D-141 North

Photo D-142 East



Photo D-143 South

Photo D-144 West



Photo D-145 Ground



SITE 20 – W20_0



Photo D-146 North

Photo D-147 East



Photo D-148 South

Photo D-149 West



Photo D-150 Ground



APPENDIX E MDS RAIL LOOP SITE PHOTO MONITORING



SITE MDSRL01 – H01_0M



Photo E-1 North

Photo E-2 East



Photo E-3 South

Photo E-4 West



Photo E-5 Ground



SITE MDSRL01 – H01_50M



Photo E-6 North

Photo E-7 East



Photo E-8 South

Photo E-9 West



Photo E-10 Ground



SITE MDSRL02 – H02_0 M



Photo E-11 North

Photo E-12 East



Photo E-13 South

Photo E-14 West



Photo E-15 Ground



SITE MDSRL02 – H02_50M



Photo E-16 North

Photo E-17 East



Photo E-18 South

Photo E-19 West



Photo E-20 Ground



SITE MDSRL03 – H03_0M



Photo E-21 North

Photo E-22 East



<image>

Photo E-25 Ground



SITE MDSRL03 – H03_50M



Photo E-26 North

Photo E-27 East



Photo E-28 South

Photo E-29 West



Photo E-30 Ground



SITE MDSRL04 – H04_0M



Photo E-31 North

Photo E-32 East



Photo E-33 South

Photo E-34 West



Photo E-35 Ground



SITE MDSRL04 – H04_50M



Photo E-36 North

Photo E-37 East



Photo E-38 South

Photo E-39 West



Photo E-40 Ground



SITE MDSRL05 – W05_0



Photo E-41 North

Photo E-42 East



Photo E-43 South

Photo E-44 West



Photo E-45 Ground



APPENDIX F LEXINGTON OFFSET SITE PHOTO MONITORING



SITE 01 – H01_0M



Photo F-1 North

Photo F-2 East



Photo F-3 South

Photo F-4 West



Photo F-5 Ground



SITE 01 - H01_50M



Photo F-6 North

Photo F-7 East



Photo F-8 South

Photo F-9 West



Photo F-10 Ground



SITE 02 – H02_0M



Photo F-11 North

Photo F-12 East



Photo F-13 South

Photo F-14 West



Photo F-15 Ground


SITE 02 - H02_50M



Photo F-16 North

Photo F-17 East



Photo F-18 South

Photo F-19 West



Photo F-20 Ground



SITE 03 – H03_0M



Photo F-21 North

Photo F-22 East



Photo F-23 South

Photo F-24 West



Photo F-25 Ground



SITE 03 – H03_50M



Photo F-26 North

Photo F-27 East



Photo F-28 South

Photo F-29 West



Photo F-30 Ground



SITE 04 – H04_0M



Photo F-31 North

Photo F-32 East



Photo F-33 South

Photo F-34 West



Photo F-35 Ground



SITE 04 - H04_50M



Photo F-36 North

Photo F-37 East



Photo F-38 South

Photo F-39 West



Photo F-40 Ground



SITE 05 – H05_0M



Photo F-41 North

Photo F-42 East



Photo F-43 South

Photo F-44 West



Photo F-45 Ground



SITE 05 - H05_50M



Photo F-46 North

Photo F-47 East



Photo F-48 South

Photo F-49 West



Photo F-50 Ground



SITE 06 - H06_0M



Photo F-51 North

Photo F-52 East



Photo F-53 South

Photo F-54 West



Photo F-55 Ground



SITE 06 - H06_50M



Photo F-56 North

Photo F-57 East



Photo F-58 South

Photo F-59 West



Photo F-60 Ground



SITE 07 – H07_0M



Photo F-61 North

Photo F-62 East



Photo F-63 South

Photo F-64 West



Photo F-65 Ground



SITE 07 – H07_50M



Photo F-66 North

Photo F-67 East



Photo F-68 South

Photo F-69 West



Photo F-70 Ground



SITE 08 – H08_0M



Photo F-71 North

Photo F-72 East



Photo F-73 South

Photo F-74 West



Photo F-75 Ground



SITE 08 - H08_50M



Photo F-76 North

Photo F-77 East



Photo F-78 South

Photo F-79 West



Photo F-80 Ground



SITE 09 – H09_0M



Photo F-81 North

Photo F-82 East



Photo F-83 South

Photo F-84 West



Photo F-85 Ground



SITE 09 - H09_50M



Photo F-86 North

Photo F-87 East



Photo F-88 South

Photo F-89 West



Photo F-90 Ground



SITE 10 - H10_0M



Photo F-91 North

Photo F-92 East



Photo F-93 South

Photo F-94 West



Photo F-95 Ground



SITE 10 - H10_50M



Photo F-96 North

Photo F-97 East



Photo F-98 South

Photo F-99 West



Photo F-100 Ground



SITE 11 – H11_0M



Photo F-101 North

Photo F-102 East



Photo F-103 South

Photo F-104 West



Photo F-105 Ground



SITE 11 - H11_50M



Photo F-106 North

Photo F-107 East



Photo F-108 South

Photo F-109 West



Photo F-110 Ground



SITE 12 – H12_0M



Photo F-111 North

Photo F-112 East



Photo F-113 South

Photo F-114 West



Photo F-115 Ground



SITE 12 – H12_50M



Photo F-116 North

Photo F-117 East



Photo F-118 South

Photo F-119 West



Photo F-120 Ground



SITE 13 – H13_0M



Photo F-121 North

Photo F-122 East



Photo F-123 South

Photo F-124 West



Photo F-125 Ground



SITE 13 – H13_0M

No photos available.



SITE 14 – W14_0



Photo F-126 North

Photo F-127 East



Photo F-128 South

Photo F-129 West



Photo F-130 Ground



SITE 15 – W15_0



Photo F-131 North

Photo F-132 East



Photo F-133 South

Photo F-134 West



Photo F-135 Ground



SITE 16 – W16_0



Photo F-136 North

Photo F-137 East



Photo F-138 South

Photo F-139 West



Photo F-140 Ground



SITE 17 – W17_0



Photo F-141 North

Photo F-142 East



Photo F-143 South

Photo F-144 West



Photo F-145 Ground



SITE 18 – W18_0



Photo F-146 North

Photo F-147 East



Photo F-148 South

Photo F-149 West



Photo F-150 Ground



SITE 19 – W19_0



Photo F-151 North

Photo F-152 East



Photo F-153 South

Photo F-154 West



Photo F-155 Ground



SITE 20 – W20_0



Photo F-156 North

Photo F-157 East



Photo F-158 South

Photo F-159 West



Photo F-160 Ground



APPENDIX G LEXINGTON RAIL LOOP OFFSET SITE PHOTO MONITORING



SITE LEXRL01 – H01_0M



Photo G-1 North

Photo G-2 East



Photo G-3 South

Photo G-4 West





SITE LEXRLO1 – H01_50M





Photo G-8 South

Photo G-9 West



Photo G-10 Ground



SITE LEXRLO2 – HO2_OM



Photo G-11 North

Photo G-12 East



Photo G-13 South

Photo G-14 West



Photo G-15 Ground



SITE LEXRLO2 – H02_50M



Photo G-16 North

Photo G-17 East



Photo G-18 South

Photo G-19 West



Photo G-20 Ground



SITE LEXRL03 – H03_0M



Photo G-21 North

Photo G-22 East



Photo G-23 South

Photo G-24 West



Photo G-25 Ground


SITE LEXRLO3 – H03_50M



Photo G-26 North

Photo G-27 East



Photo G-28 South

Photo G-29 West



Photo G-30 Ground



SITE LEXRLO4 – H04_0M



Photo G-31 North

Photo G-32 East



Photo G-33 South

Photo G-34 West



Photo G-35 Ground



SITE LEXRLO4 – H04_50M



Photo G-36 North

Photo G-37 East



Photo G-38 South

Photo G-39 West



Photo G-40 Ground



SITE LEXRL05 – H05_0M



Photo G-41 North

Photo G-42 East



Photo G-43 South

Photo G-44 West



Photo G-45 Ground



SITE LEXRL05 – H05_50M



Photo G-46 North

Photo G-47 East



Photo G-48 South

Photo G-49 West



Photo G-50 Ground



SITE LEXRLO6 – H06_0M



Photo G-51 North

Photo G-52 East



Photo G-53 South

Photo G-54 West



Photo G-55 Ground



SITE LEXRLO6 – H06_50M



Photo G-56 North

Photo G-57 East



Photo G-58 South

Photo G-59 West



Photo G-60 Ground



SITE LEXRL07 – H07_0M



Photo G-61 North

Photo G-62 East



Photo G-63 South

Photo G-64 West



Photo G-65 Ground



SITE LEXRL07 – H07_50M



Photo G-66 North

Photo G-67 East



Photo G-68 South

Photo G-69 West



Photo G-70 Ground



SITE LEXRL08 – W08_0



Photo G-71 North

Photo G-72 East



Photo G-73 South

Photo G-74 West



Photo G-75 Ground



SITE LEXRL09 – W09_0



Photo G-76 North

Photo G-77 East



Photo G-78 South

Photo G-79 West



Photo G-80 Ground



SITE LEXRL10 – W10_0



Photo G-81 North

Photo G-82 East



Photo G-83 South

Photo G-84 West



Photo G-85 Ground



SITE LEXRL11 – W11_0



Photo G-86 North

Photo G-87 East



Photo G-88 South

Photo G-89 West



Photo G-90 Ground



SITE LEXRL12 – W12_0



Photo G-91 North

Photo G-92 East



Photo G-93 South

Photo G-94 West



Photo G-95 Ground